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MAY, 1943

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PROGRESS



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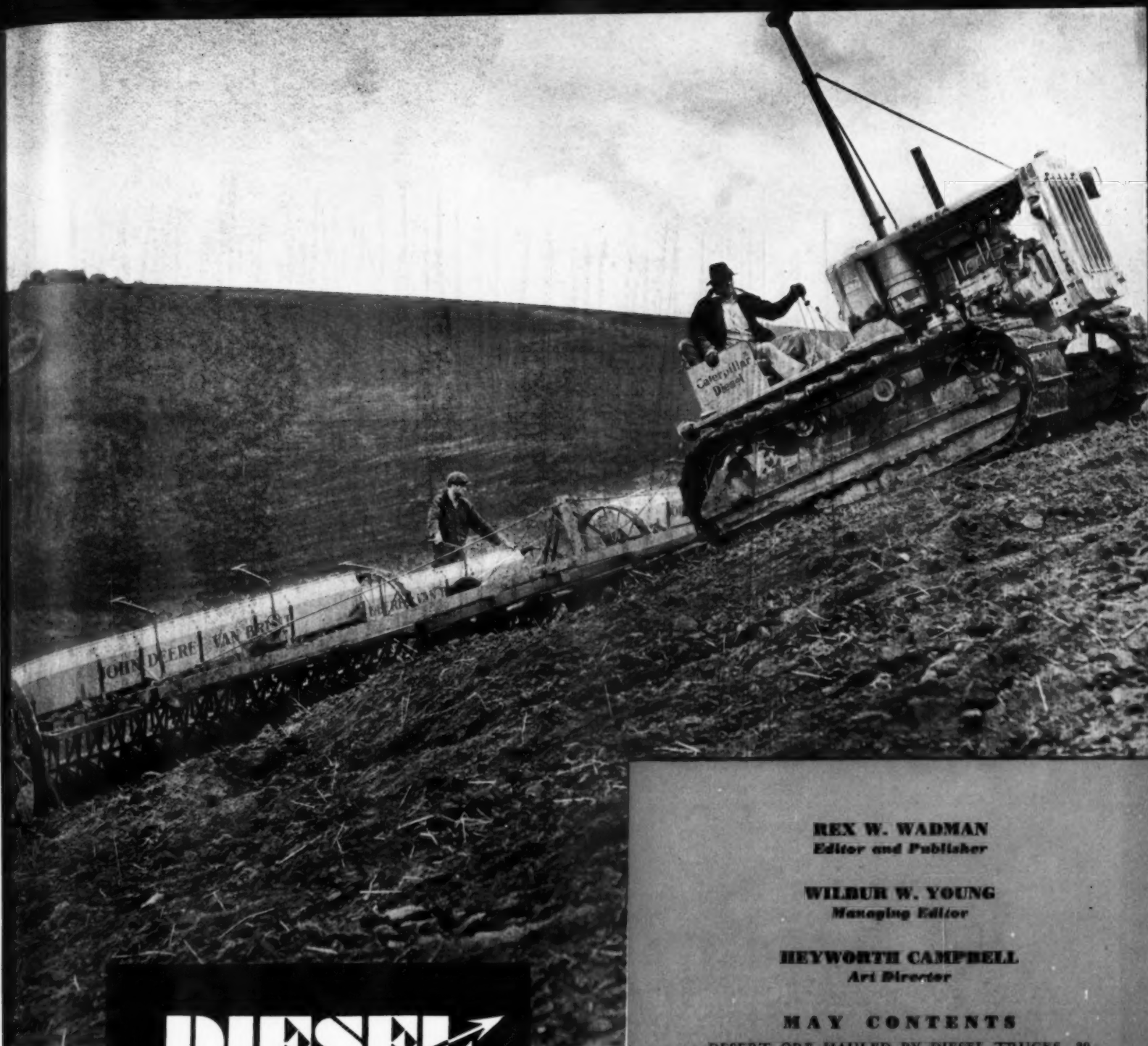
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DIESEL PROGRESS, for May, 1943. Volume IX, Number 5. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex. W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: \$5.00 per year, single copy, 50c.



DIESEL *and* **GAS ENGINE PROGRESS**

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WILBUR W. YOUNG
Managing Editor

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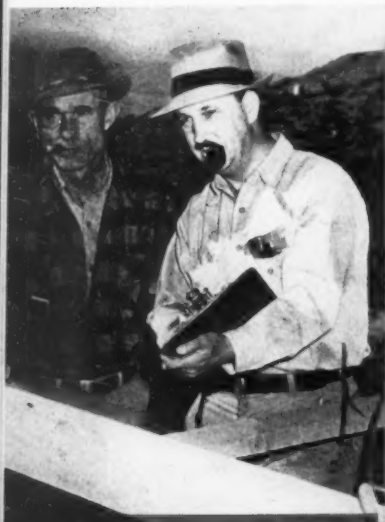
FRONT COVER ILLUSTRATION: United States Maritime Commission Tug built by Ira S. Bushey and Sons, Brooklyn, N. Y. and powered with Fairbanks, Morse main and auxiliary Diesels.

TABLE OF CONTENTS ILLUSTRATION: Caterpillar Diesel tractor and grain drill sowing peas in eastern Washington. Outfit covers 8 acres an hour.

DIESEL PROGRESS for May, 1943, Vol. IX, No. 5. Published monthly by Diesel Engines, Inc., 2 West 45th Street, New York, N. Y. Tel. MUrray Hill 2-7535. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year.

DESERT ORE FOR KAISER'S PIGS

By JIM MEDFORD



Head men of Kaiser's Vulcan Mine: Fred W. Horden, construction superintendent, left, and Bob Tally, mine superintendent.



A. V. Smith at the controls of the big Bucyrus-Erie shovel.

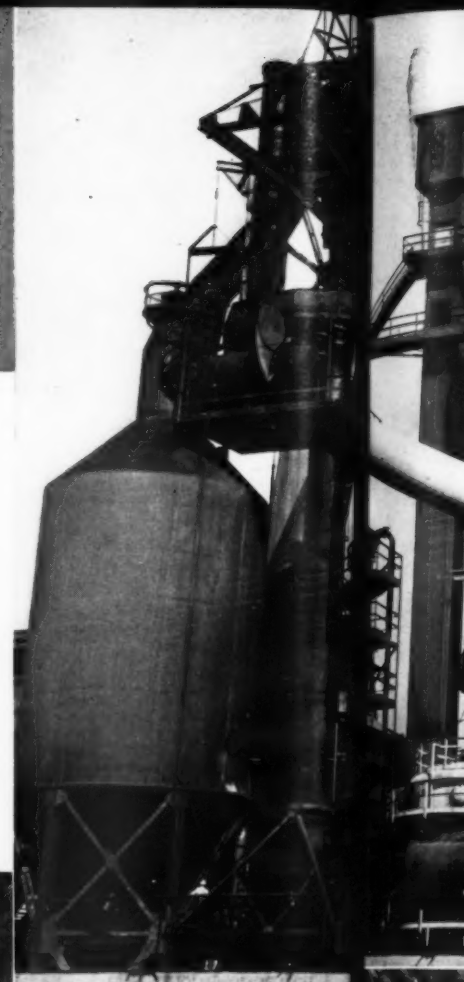
THE even blue of the sky is undisturbed. From the unfriendly hills, a lusty wind bores in. Its flint-like particles of volcanic cinder dust churn across the raw gash of a newly paved strip. Through it all burns a white-hot sun on a road-filling transport that is a cross between a locomotive and a hopper scow. It's from the Vulcan mine out back-of-beyond where Henry J. Kaiser gets his ore for his new steel venture 183 miles away. Distance, 120-degree summer temperatures, frosty winter nights, these meant nothing to the West Coast genius. In his American way, he wanted that hematite ore for his California plant at Fontana. Nine miles of tough, trackless desert lying between the huge deposit and Bill Jeffer's Union Pacific railhead at Kelso, California, made no difference to this ace wartime shipbuilder—it was just another of many "impossible" incidents.

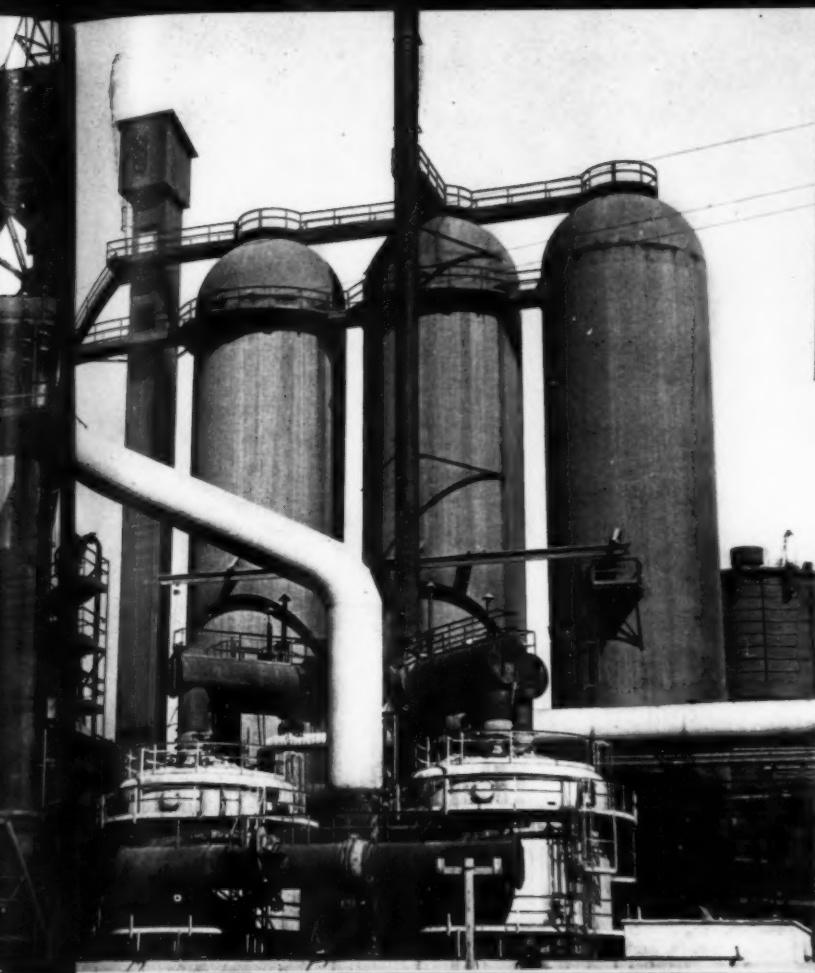
In no time at all, as the Kaiser "boys" figure things, the "desert rats" rubbed their eyes and took a second look at what *could* be a mirage—the equivalent of "railroad battleships" were rolling over a paved road where but the day before only sage and mesquite flourished. The credit for the major part of this magic is due Fred W. Horden, construction superintendent, and Bob Tally, mine superintendent, two experienced and desert-conscious pushers.

The Six-Wheel highway battleships, that are no mirage, have the comparative capacity of a railroad gondola, fifty tons, and roll on Jeffer's doughnuts, formerly known as rubber tires. They pull into Kelso over the company owned and maintained pavement with 25 yards of Vulcan 53.2 ore-content rock behind their 200 hp. at 1800 rpm. Waukesha-Hesselmann multi-fuel engines. Their load goes onto the conveyors that feed into gons spotted on the two-track spur. The ore is automatically weighed and recorded by a weightometer incorporated into the conveyor. Then back they go to their desert "surface" mine for another charge to meet the 2,500-ton daily demand of the second largest blast furnace in the United States. And a surface mine is exactly what it is—the ore goes the grass roots one better; it's above 'em!

The Vulcan mine, with a blocked-out area of 240,000 square feet and clear of overburden, is worked by 165 hp. Buda-Lanova Diesel engined 2½-yard Bucyrus-Erie shovels that are self-propelled on their 36-inch treads. These Diesel shovels spew their tons of mine-run into a fleet of three Euclid ten-yard, rear-dump trucks that shuttle between the working grounds and the crusher that keeps supplied the 7,000-ton line storage pile. From this stock pile, conveyors load the six-unit fleet of Maxis that perform the highway haul. The Euclids are powered with Cummins Diesels rated 150 hp. at 1800 rpm.

Arriving at the West Coast's original steel plant of the Kaiser Company, Inc., other Diesels take over the 2,500 daily tons of ore that means an annual output of 675,000 annual-tons of steel ingots. These Diesels are also by Cummins, and they're in switchers by General Electric. Built in two sizes, they economically handle the interplant traffic from ore to pigs.

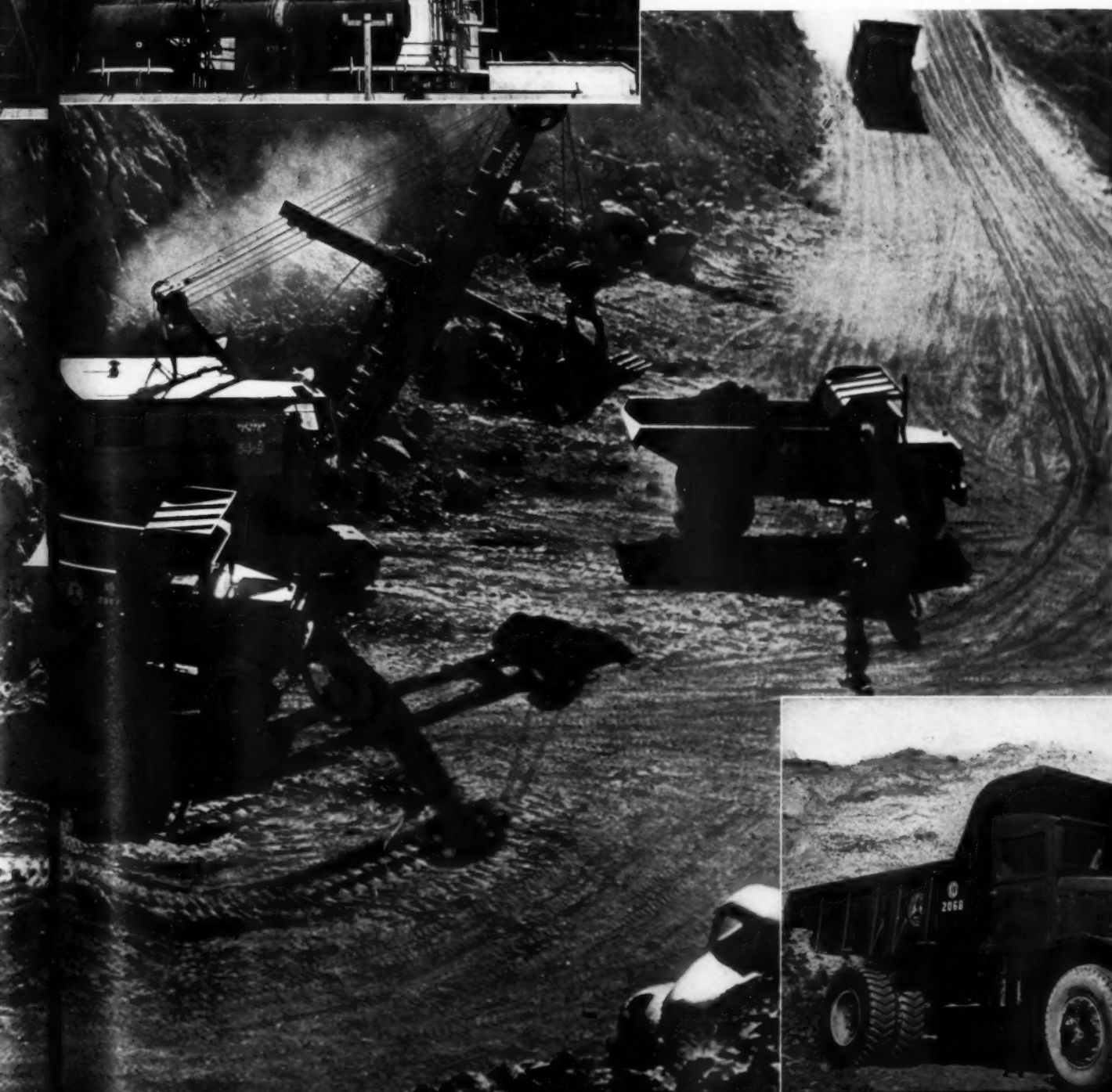




*Kaiser's blast furnace—130 feet high
—is second largest in the United
States.*



*A 50-ton Maxi truck, powered with a
Waukesha-Hesselmann 200 hp. multi-fuel en-
gine. This outfit handles 25 yards of mine-
run ore from mine to railhead—an 18-mile
round trip in 53 minutes.*



*Heart of the mine.
The shovel is a 2½
yard Bucyrus-Erie,
powered with a
Buda-Lanova 160 hp.
Diesel operating on
a fuel cost of 45 cents
an hour.*



*One of the 10-yard
Euclid trucks, pow-
ered with Cummins
150 hp. Diesels oper-
ating at a fuel cost
of about 8 mills per
yard moved.*





CONNORS CONVERTS ANOTHER TUG

By GEORGE D. CROSSLEY

A RECENT addition to the fleet of New York Harbor and Canal tugs owned and operated by Connors Marine Company is the *Elise Ann Connors*, the sixth tug of Connors Marine Company equipped with an Atlas-Imperial Diesel Engine, the others being: *Anna L. Connors*, 600 hp.; *Harry R. Connors*, 525 hp.; *Dynamic*, 400 hp.; *Gramercy*, 250 hp.; *Tourist*, 250 horsepower.

The *Elise Ann Connors*, formerly the steam tug *Harford* was acquired by the Connors Marine Company last November. She is a charcoal iron hull of the following registered dimensions: Length 73.5 ft., beam 18.0 ft., depth 7.6 ft. She was built at Camden, N. J., in 1881 as the *Edwin D. Hartley* and later renamed the *Harford* by her previous owners, The Warner Co. of Philadelphia, Pa.

Mr. Robert S. Haight was retained by Connors to reconstruct and recondition the hull for the conversion to Diesel propulsion and this work was let to the Jakobson Shipyard at Oyster Bay, L. I., last January. This work necessitated the renewal of several hull plates, frames and other structural members such as bulk heads, engine beds, etc. A new rudder was also installed and the steering gear supplied by the Jakobson Shipyard.

A six cylinder Atlas-Imperial four cycle, direct reversible marine Diesel engine with 13" bore and 16" stroke and rated to develop 400 hp. at 300 rpm. was selected for this installation.

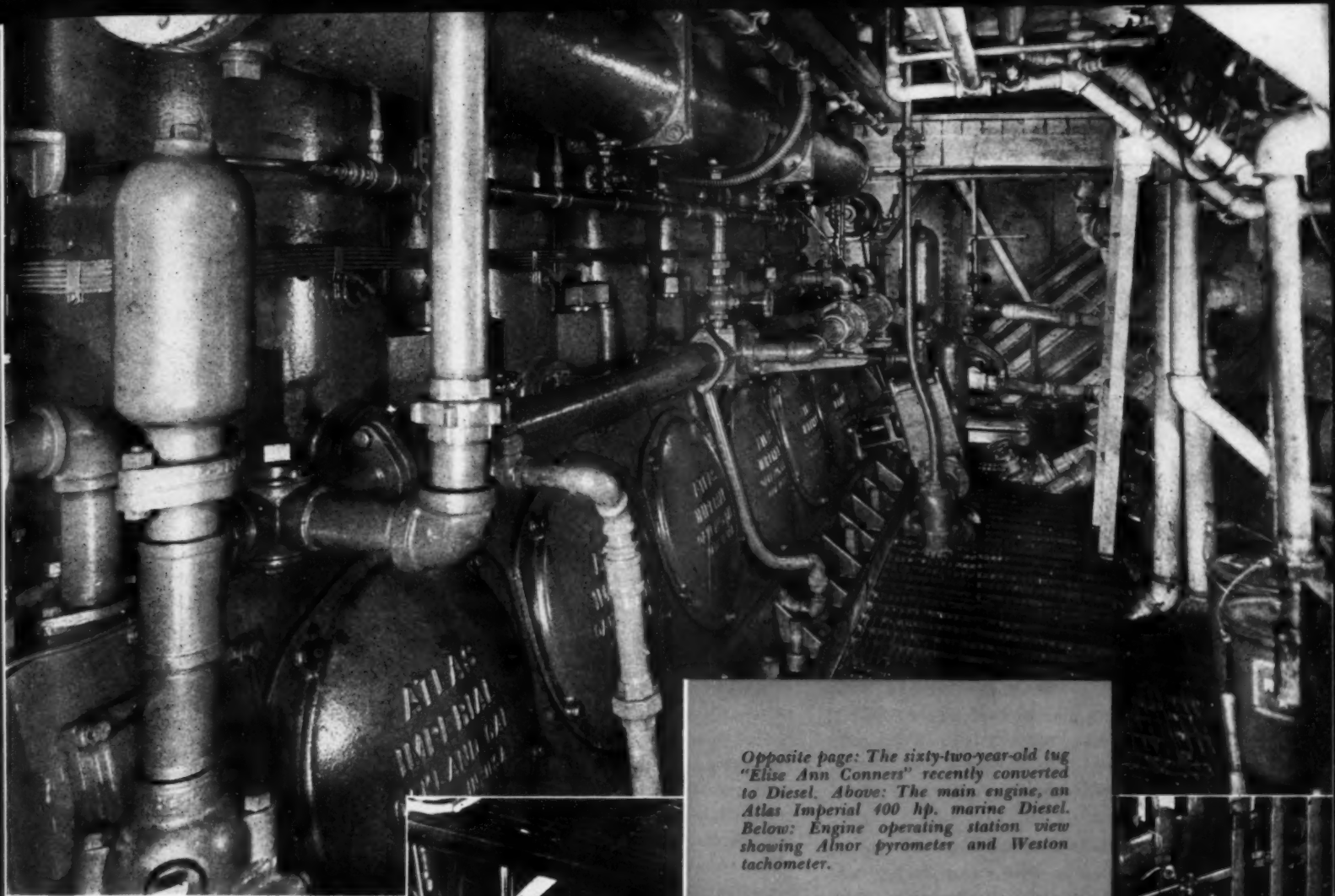
Special features of this engine include a single lever automatic air ram control system for quick maneuvering and a Kingsbury thrust bearing forming an integral part of the engine. These features are nowadays invariably incorporated by Atlas for engines intended for tugboat service where quick handling and capacity for sustained towing thrust over long periods are of paramount importance.

The auxiliary unit consists of a four cylinder Hercules four cycle Diesel engine with 4" bore and 4½" stroke and rated to develop 30 hp. at 1200 rpm. Mounted on an extended welded structural steel subbase, this engine is direct connected to a 5 kw. 1200 rpm. 32/40 volt marine type, drip proof Imperial electric DC generator with an extended shaft off which is driven through clutch and "V" belts a Quincy two stage air cooled air compressor having a displacement of 40 cubic feet at 250 lbs. working pressure. Also driving through clutch and "V" belts is a bilge and general service pump of the Viking Pump Co. having a capacity of 90 gpm. at 100 lbs. pressure.

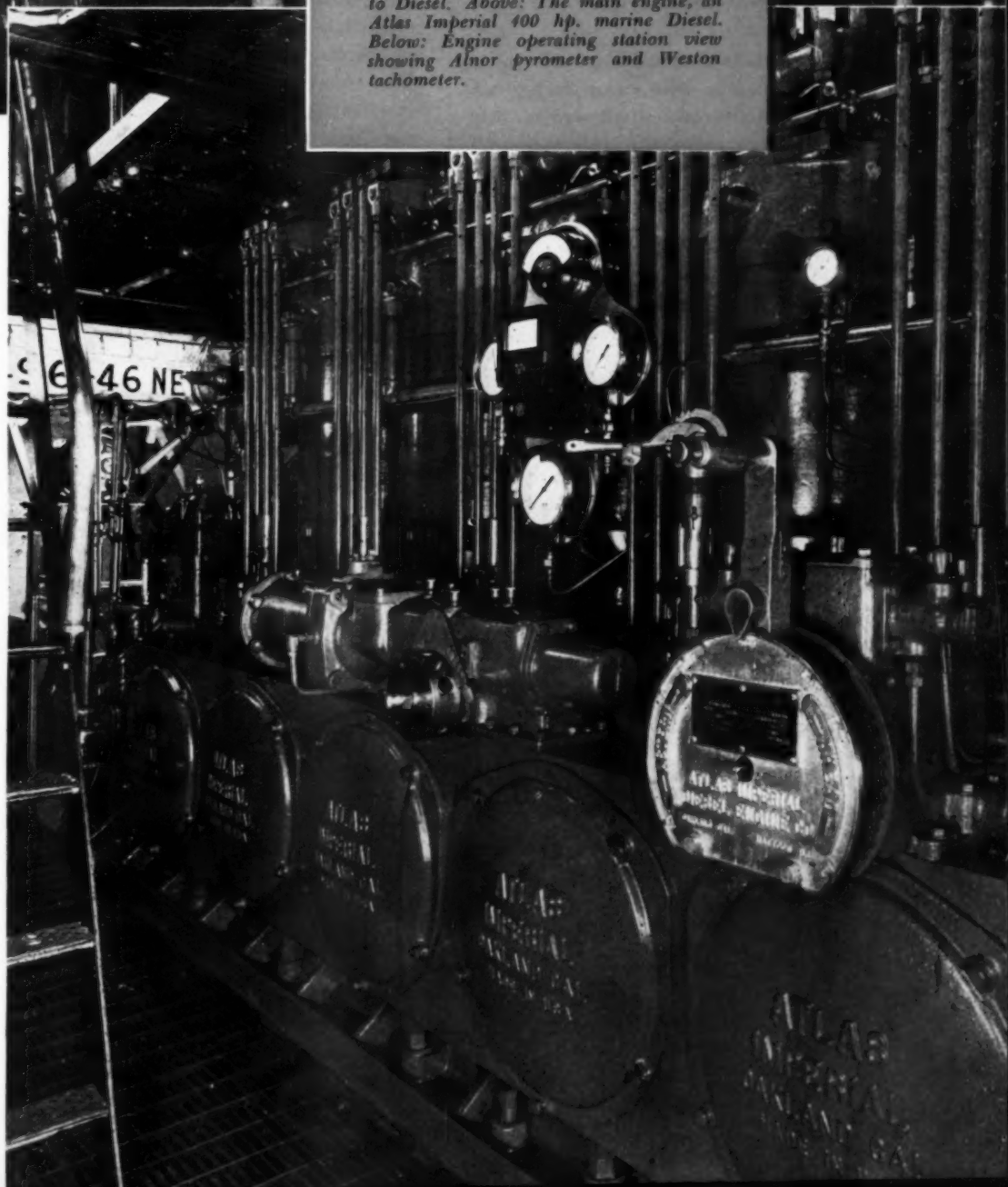
Forward of the main engine there is a rectangular shaped inbuilt fuel tank having a capacity of 3400 gallons. Forward of this tank the four 30 x 96" starting and maneuvering air receivers are located with extension shut off valves for the convenience of the operator. These four air receivers have ample capacity not only to maneuver the main engine but also for operation of the air ram steering gear and the signal horn both of which operate through valves reducing the air pressure to 60 lbs. per square inch.

Off the intermediate shaft a double "V" belt drive operates a 3 kw. 800/1200 rpm. variable speed 32/40 volt marine type drip proof Imperial electric d.c. generator and a 3½" suction 3" discharge all bronze Weinman reversible centrifugal type sea water pump for the fresh water cooling system. This consists of a shell and tube type heat exchanger that reduces the temperature of the cooling water discharged from the main and auxiliary engines from approximately 160° to approximately 130°.

To complete the electric system there is a 16 cell 32/40 volt Exide Ironclad storage battery having a capacity of 252 ampere hours at the eight hour discharge rate. Floated on the line this battery is controlled from a single switch-



Opposite page: The sixty-two-year-old tug "Elise Ann Connors" recently converted to Diesel. Above: The main engine, an Atlas Imperial 400 hp. marine Diesel. Below: Engine operating station view showing Alnor pyrometer and Weston tachometer.



board with a double throw switch for the auxiliary and shaft driven generators. Maxim SC Spark arrester silencers are used for both main and auxiliary Diesels and these are mounted in the stack which is of the low type common on Canal tugs. A Brown Automatic Alarm System is installed to signal low pressure on lubricating oil or excessive temperature rise or lack of cooling water. This system operates on the battery current and is so designed as to eliminate so-called "nuisance" alarms. When starting the engine it will not signal low lubricating oil pressure when the pressure is building up but only on failure of pressure to build up with the speed of the engine.

An Alnor Pyrometer is mounted on the engine gauge board to indicate the exhaust temperature of each cylinder of the main engine as is also a Weston Electrical Tachometer to indicate the rpm. A four blade bronze propeller, 70" in diameter and 40" of pitch, drives through a 6" diameter tail shaft.

The *Elise Ann Connors* was placed in commission after but a few hours of dock trials. As everything functioned perfectly and as there was no time for the conventional harbor trial this was dispensed with to give the *Elise Ann Connors* her first assignment.

GAS ENGINES INSTEAD OF TAXES

THE City of Robstown, Texas, put a municipal power plant into operation at the close of 1939 with two purposes in mind; first, to provide sufficient funds to run the city government without raising the then present low tax rate; second, to provide the residents with electric power at low cost. It had become evident to public officials that health, fire protection, police protection and the other services essential to the conduct of a modern city could not be continued without increasing taxes sharply or finding a new source of revenue. The municipal power plant offered an ideal solution, for the required funds could be obtained without penalizing the public in any way. In fact, Robstown officials understood the concept of enlightened utility operators that profits can best be assured by selling electric power at the lowest practicable rate.

Acting on this decision, Robstown constructed a modern power plant with two 525 hp. and one 700 hp. Superior natural gas engines. This plant went into operation in December 1939. Six months later, a second 700 hp. unit was installed. An internal-combustion type plant was chosen since it is recognized as the most efficient in this horsepower range. The engines picked are convertible and can be operated as either full Diesels or as natural gas burning units. Gas is used at present because an ample supply is available at exceedingly low cost. The city operates the local gas utility and as shown in the city records the light plant pays the Gas Department 7½ cents per 1000 cubic feet for gas used as fuel. If, at any time, the situation is altered and it is deemed advisable to use oil as fuel, the engines can be easily converted to Diesel operation.

After approximately a year and a half of operation on gas fuel it is evident that the Robstown plant is achieving both initial objectives, and this success is based on economical power production. Total operating costs for the first year and a half, during which time the plant produced 4,097,000 kwh., including labor, fuel, water, lubricants, maintenance and repairs, and supplies, were \$21,408. This means a production cost of 5.2 mills per kilowatt-hour.

The first five months of 1941, the second year of operation, give a truer picture of normal

operating costs. Labor for the period was \$2,975.00, fuel cost \$1,653.12, water was charged at \$218.68, water treatment was \$323.97, lubricants cost \$468.76, maintenance and repairs were \$346.01 and miscellaneous supplies came to \$285.93. This made a total of \$6,271.52. Kilowatt-hour production for the five months was 1,313,700 at a cost of 4.77 mills per kwh. Production economy has been the means to the desired ends. Although the city had just begun the development of its load, sale of electric power to domestic, commercial and rural customers brought in \$62,692.20 during the year 1940. After deduction of power plant, distribution, administrative and general expenses, interest on the debt and depreciation, there remained a net profit of \$13,156.65. The city anticipates a much greater load in the coming years and the plant was designed with these prospects in mind. At the outset rates were reduced one third and the average charge per kilowatt-hour in 1940 was 3.4 cents. This figure is certain to go down as consumption increases. In addition to serving Robstown consumers, the city has a five year contract with the Nueces electric cooperative, an REA system, to supply power for 7 mills a kilowatt-hour with a 50 cent demand charge. Federal Security Administration camps in the vicinity also are supplied with power at a special, low rate.

By DWIGHT ROBISON

Designed to accommodate a fast growing load, the plant has not yet approached the limit of its generating capacity. With four engines in two sizes, however, the plant has been sufficiently flexible to permit operation at a consistently good load factor.

All four engines are four-cycle units of the same design, all with a 14½ in. bore and 20 in. stroke, developing rated horsepower at 300 r.p.m. The 700 hp. engines have 8 cylinders each and the 525 hp., 6 cylinders. Other than

crankshafts and magnetos, all parts are interchangeable, promoting operating efficiency and obviating the necessity for a large inventory of spare parts. Each engine is direct-connected to a 4160-2400 volt alternator with V-belted exciter. The generators for the 700 hp. engines are rated at 660 kva. with 80% pf. and the smaller units at 500 kva., 80% pf.

Gas reaches the plant at 115 lb. pressure and is reduced to 2½ lb. entering a 6 in. header which runs the length of the plant beneath the floor. Between the header and each engine the gas passes through a regulator that reduces pressure to 4 inches on the manometer before it enters the mixing valve. Air is drawn from outside the plant through a set of American impingement-type filters for each engine, then through a pipe under the floor and up to the mixing valves. The richness of the mixture can be adjusted by hand; the quantity of the mixture admitted to the cylinders is regulated automatically to meet load conditions by a Woodward relay-type governor for each engine. To facilitate synchronizing two or more engines, governor settings can be controlled from the switchboard. Timing of combustion within the cylinders is accomplished by two American Bosch and two Robert Bosch magnetos.

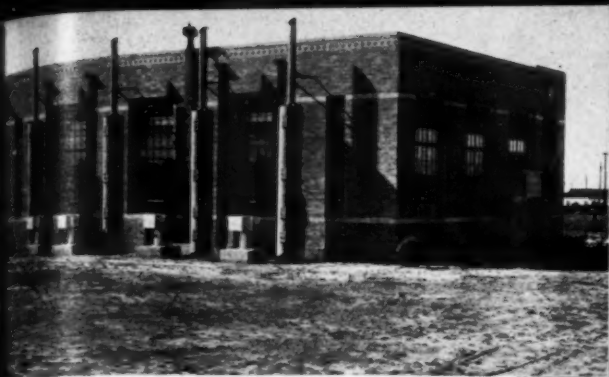
The plant operates well over 3000 hp. hrs. for each gallon of Gulf Harmony lubricating oil consumed. Each engine is lubricated completely by a force-feed system actuated by a duplex pump driven from the crankshaft. The four lube-oil sump tanks are located on a balcony from which oil flows by gravity to the suction of the pump that circulates oil through the engine. Draining to the crankcase, the lube is picked up by the scavenging side of the pump, put through a Nugent filter and a cooler and then returned to the tank on the balcony. A Hilco activated clay reclaimer on the balcony is in continuous service, taking oil from the tanks, purifying it and returning it to the tanks. A rotary pump, V-belted to a 3 hp. motor, serves as an auxiliary lube-oil pump. It can be used to circulate oil through any of the engines and is utilized to bring up oil pressure before a unit is started and to keep pressure up during the period when an engine is being stopped. Only water treated in a zeolite softener is permitted to enter the engine jackets. Three 750 g.p.m. centrifugal pumps driven directly by 25 hp. motors, circulate the soft water through the engines and the coils of two Marley atmospheric-type cooling towers. Two pumps are adequate for all the engines and the third serves as a standby. Four motor-driven rotary

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big engine

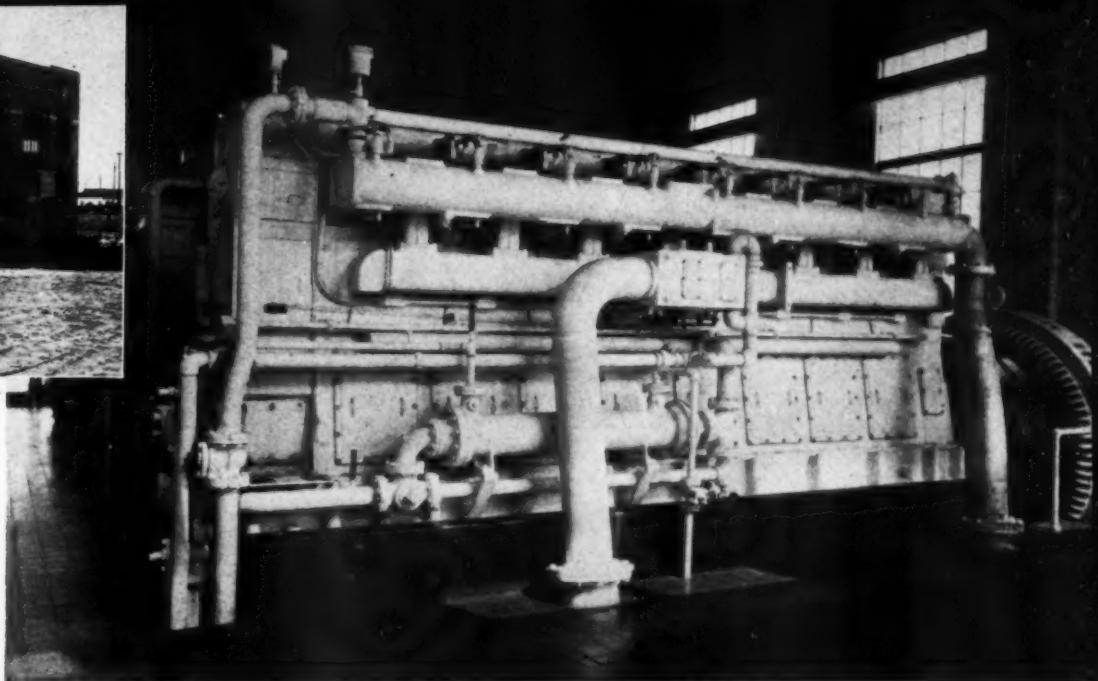
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Exterior view of the Robstown, Texas, gas engine generating plant showing Maxim exhaust silencers and American air filters.

Prime movers are two 700 hp. 8-cylinder and two 525 hp. 6-cylinder Superior gas engines. One of the big engines is shown here.



pumps take raw water from the cooling tower sumps and spray it over the tower coils. The raw water, too, is treated to reduce hardness.

An alarm system protects the engine against damage in case either the cooling or lubricating system fails. The alarm sounds if cooling water temperature goes above 160 degrees or if lubricating oil pressure drops below 10 lbs. An over-speed switch automatically grounds the magneto if engine speed goes above 350 rpm.

The plant has a six man operating staff—a Chief Engineer, three operating engineers and two oilers—and the men keep close watch on equipment in service. Each engine has a gauge board with pressure gauges, Brown exhaust pyrometer and Reliance tachometer. The 14-panel Westinghouse switchboard set flush with the wall, holds four voltage regulators, four engine-hour meters and four kilowatt-hour meters as well as power factor, kilowatt, voltage and cycle meters, giving further information on plant performance. Starting air is supplied by two V-type Ingersoll-Rand compressors, one

V-belted to a motor, the other to a gasoline engine. When the air storage tanks are exhausted, the operator starts one of these compressors and it stops automatically as soon as pressure in the tanks reaches the desired level. Exhaust gases from each engine pass through Pennsylvania flexible tubing down to a pipe below the floor and out to a vertical Maxim silencer at the side of the plant.

Robstown presents the picture of a plant achieving a creditable record of economy during its initial period of operation before load has developed to the level that reasonably may be expected. On the basis of present performance, it will be no surprise if the anticipated increased output brings plant operating costs down below 3 mills per kw. hr. With economy of that order, Robstown can be sure of providing power at low consumer rates and, of pouring substantial sums into the city treasury.

In this view are seen the four Superior gas engines and Westinghouse generators.

The success already achieved could not have been possible without a well-managed system or without good equipment capably operated. The plant is under the supervision and control of a non-political board of trustees consisting of Mr. Wm. Bauer, Jr., Chairman; Mr. H. B. Nichols; Mr. George B. Wilson; Mr. James G. McCarrick and Mr. John W. Kellam, Mayor and General Manager. Mr. Kellam's intelligent handling of power plant problems, and the high calibre of his leadership in both the construction and operation of the plant are all too rare, and have been vital factors in making the Robstown power plant an outstanding municipally owned utility. E. King Copeland, Office Manager, was responsible for the broad advertising campaign that did much to increase consumption of electricity in Robstown. Mr. Copeland has set up a complete system of informative and analytical plant records which make it possible to gauge efficiency of operation. Responsibility for actual operation of the plant devolves upon Superintendent W. H. House.



IRA S. BUSHEY and Sons of Brooklyn, New York have just completed the delivery of a number of fine, outstanding tugs to the United States Maritime Commission. "Bushey-built", the phrase which is so well known and universally acclaimed on the East Coast and particularly on the waters of New York Harbor, is synonymous with fine tug design and construction. Like the slogan, "Ask the man who owns one," which refers to one of America's leading quality cars, the term "Built by Bushey" or "Bushey-built" for short, applies to only the best there is in the design and construction of those hard working tugs one sees so much in evidence pushing barges, towing, and placing huge ocean-going vessels so deftly in their slips.

The recent entry of several new tugs into Naval service and now an additional number into the service of the United States Maritime Commission, continues a long and harmonious association of Bushey-built tugs and Fairbanks-Morse Diesels, a combination that has functioned so successfully in the past and augurs well for the future.

"Bushey-built" is not one of those things of happenstance. Back of their reputation of a good job, well done, is the vision and foresight of Ira S. Bushey, the founder of this enterprising firm of ship-builders, who in 1905 with his four sons started the business of repairing and building boats in Brooklyn. At that time, the policy of the company was never to allow any shoddy workmanship to get by. On the best of materials were used, applied in a workmanlike manner and no job was permitted to leave the yards until it had the personal approval of the founder.

This is the policy on which the Bushey organization was built—a bed-rock foundation that has weathered good times and bad and a policy that is still in effect. Is it any wonder then that Ira S. Bushey & Sons today have not only an East Coast reputation for quality, but a world-wide one as well? Boat builders from the West Coast, from the South Coast, from the Hawaiian Islands, and yes, even from foreign parts visited the Busheys before the war, to see how they did it. And they all went away convinced that "Bushey-built" meant the last word in quality of design, construction, materials and machinery equipment.

Today the senior Ira S. Bushey is gone to his reward and so is one of his sons, William, but Francis S. Bushey, President, Ira S. Bushey, Jr., Vice-President and Raymond J. Bushey, Treas-

urer, carry on with the same vim and vigor with which the firm was imbued by their illustrious father.

It is this inherent background that provides the royal boat-building ancestry of famous tugs now seen at their daily tasks in Brooklyn and New York Harbors, in Panama, in the waters surrounding Iceland and Greenland—in fact, almost everywhere work boats are used.

The Busheys are pioneers in all-welded steel construction. In 1930 they built the **FIRST** all-welded steel vessel in the world to carry a coast-wise license. In 1935 they constructed the *Cheyenne* and *Chippewa* all-welded steel tugs—77 footers that are still standing the "gaff" in severe service.

The following year there were the *Cayuga* and *Calatco* and then the *Choctaw* and the *Commanche*—all Fairbanks-Morse Diesel engined. In 1937 and 1938, new construction was chiefly devoted to 90-foot tugs including *Carmelite* now in Navy service, *Flushing*, "still as good as new," *Cardinal*—and the *Chancellor*.

Always building bigger and better, always learning and never quite satisfied (a living indication of the Bushey's desire to excel) they carried on. Came the *Providence* in 1939—this time a 90-footer and the *D. T. Sheridan*, a 116-footer, and many others. Over fifty of these sturdy, all-welded steel tugs have left the ways of the Bushey yards since that first one, the *Cheyenne*, was launched in 1935. And all powered with Fairbanks-Morse Diesels, with F-M pumps, motors and auxiliaries.

A record to be proud of? Yes—for not a single one of these tugs has been a "black sheep"—significant of their ancestry. Day in and day out they may be seen doing their hard tasks—for the work of a tug-boat is no sissy job. The latest products of this highly acclaimed yard, the several tugs for the U. S. Maritime Commission, are built in the truly traditional Bushey style. In fact in marine circles, it has now become a by-word that "What's special on the average tug is standard with Bushey."

Here are some of the features which testify to the truth of this statement. A glance at the illustrations of these new 100 foot tugs for the Maritime Commission shows them to be of heavy, sturdy and serviceable construction—three qualities that readily identify them as Bushey-built. They also indicate stability, ease of maneuverability, power and strength to meet the most arduous service.

BUSHEY BUILDS MARITIME COMMISSION TUGS

Like their sister-ships recently built by Bushey for Naval service, these latest tugs are of all-welded steel, constructed on the Bushey "chine" system, with four chines and four plates on each side between keel and deck. In this system, the shell plates are straight in transverse sections and are joined together longitudinally in a series of knuckles which fade out aft being faired into the stem and stern frames.

These new tugs have the same sturdy seven-cylinder, two-cycle, airless injection, direct-drive, direct-reversible, Fairbanks-Morse Diesel turning a three-blade bronze propeller, of special design, at 300 RPM. A 20 kw. Electro-Dynamic tail shaft generator is driven by means of eight "V" belts from the aft end of each main engine.

The 20 kw., 125 volt dc, Diesel generating set, located aft of midships on the port side of the main engine room consists of a Fairbanks-Morse, 4 1/4" bore x 6" stroke, basic marine Diesel engine rated at 40 hp., at 1200 rpm. and an F-M 20 kw., 125 volts marine type generator with flexible coupling, all of which are mounted on a common steel sub-base.

The marine Diesel auxiliary set, located on the starboard side of the main engine room, consists of a Fairbanks-Morse, 2-cylinder, 4 1/4" bore x 6" stroke, 20 hp., 1200 rpm. Marine Diesel, a Gardner-Denver vertical air compressor on the aft end of the engine, a Northern pump on the forward end, Link-Belt speed reducer, Fulton Syphon fresh water regulator and lube oil alarm, all mounted on a common sub-base.

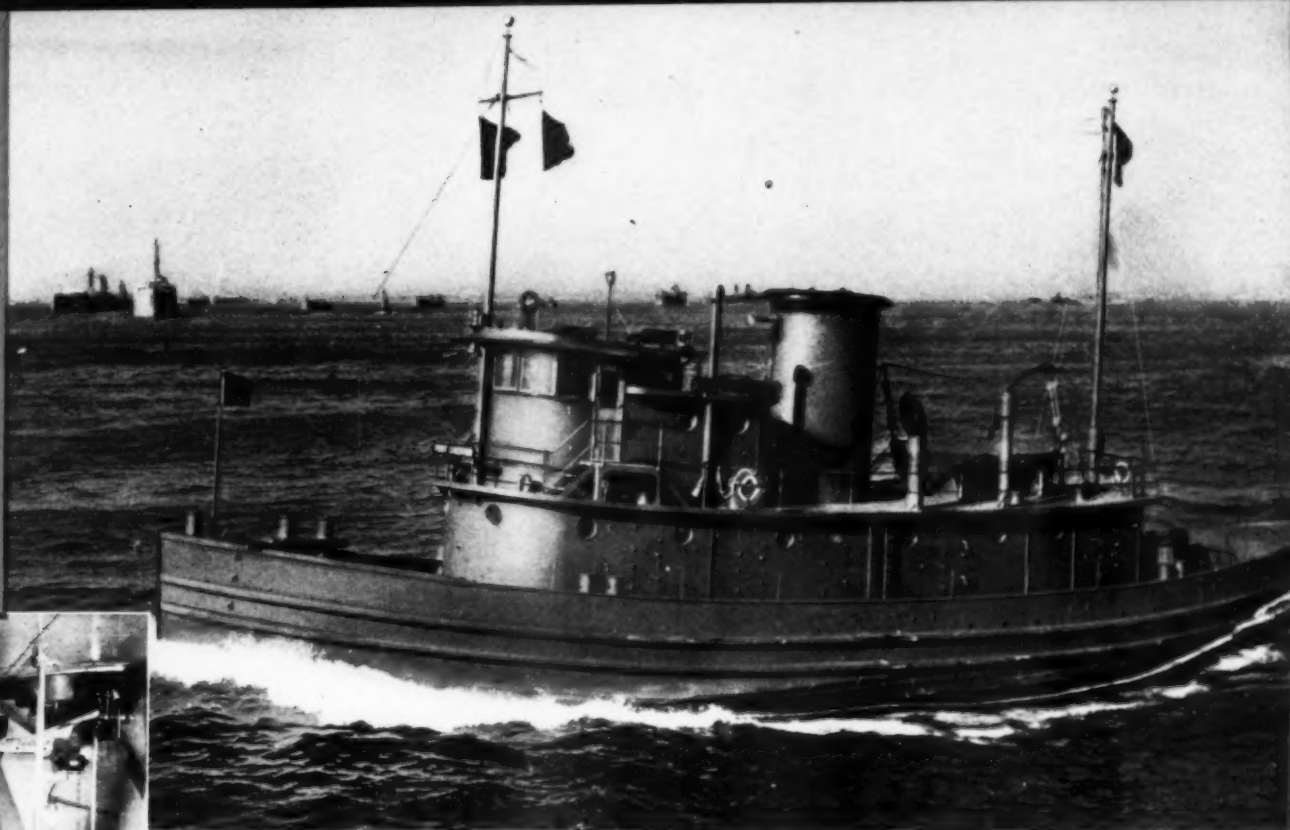
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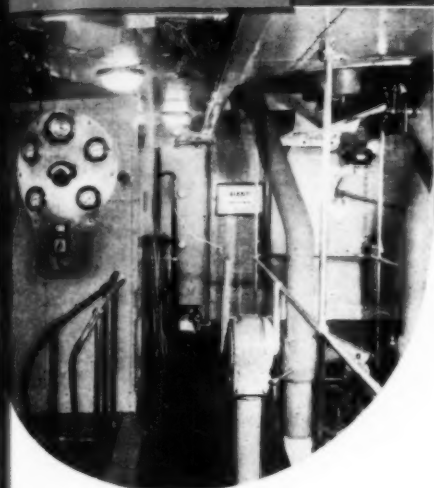
In addition ment built i engine, there stand-by pump Roper 120 gp 2" F-M pump by means of a motor. Other these tugs are chines oil puri and oil cooler storage battery.

Also among th a good deal equipment. T

By
HENRY J. BARBOUR



The "Port Chester," one of the new Bushey-built Maritime Commission tugs typifies sturdy construction and clean lines of Bushey craft.



The completely insulated upper engine room. Note F-M remote engine control, and, on the panel, Weston tachometer and Brown pyrometer.

salt water pump unit; a $\frac{3}{8}$ " rotary pump for engine room day tank fuel transfer service; a 2" motor-driven fuel transfer pump, a $\frac{3}{8}$ " motor-driven galley range fuel transfer unit, as well as two Fairbanks-Morse 450 gallon water systems, each complete with 42 gallon tank, one taking care of the fresh water requirements and the other sanitary service.

The electric hydraulic ram type steering gear furnished by the American Engineering Company is located in a compartment on a flat aft of the engine room. The electric-driven capstan, also an American Engineering product, is shaft and gear-driven from the engine room.

Immediately aft of the main engine located on the bulkhead is the electrical control panel built by Smith-Meeker Engineering Company in accordance with the specifications of Ira S. Bushey & Sons. Here we note the Weston Ammeter and Voltmeter, the Safety Car Heating and Lighting Company pile regulator and the Westinghouse magnetic contactors. Going above to the upper engine room, once again we find plenty of room for the free movements of the crew, and here also is located the Fairbanks-Morse engine control column. Nearby is an oak desk and chair for the engineer.

On the port side at the top of the gangway to the upper engine room is located the gauge panel with the Brown Pyrometer for checking

the exhaust temperatures of the cylinders on the main Fairbanks-Morse engine, a Weston Tachometer, Ashcroft Air Pressure gauges, a Duragauge lube oil pressure gauge and a Seth-Thomas clock.

Tug crews work hard and sometimes long hours at a stretch. Bushey believes their physical comfort comes first. So you will find in every "Bushey-built" tug, mess and living quarters to set them apart from other craft by virtue of their comfort and utilitarian value.

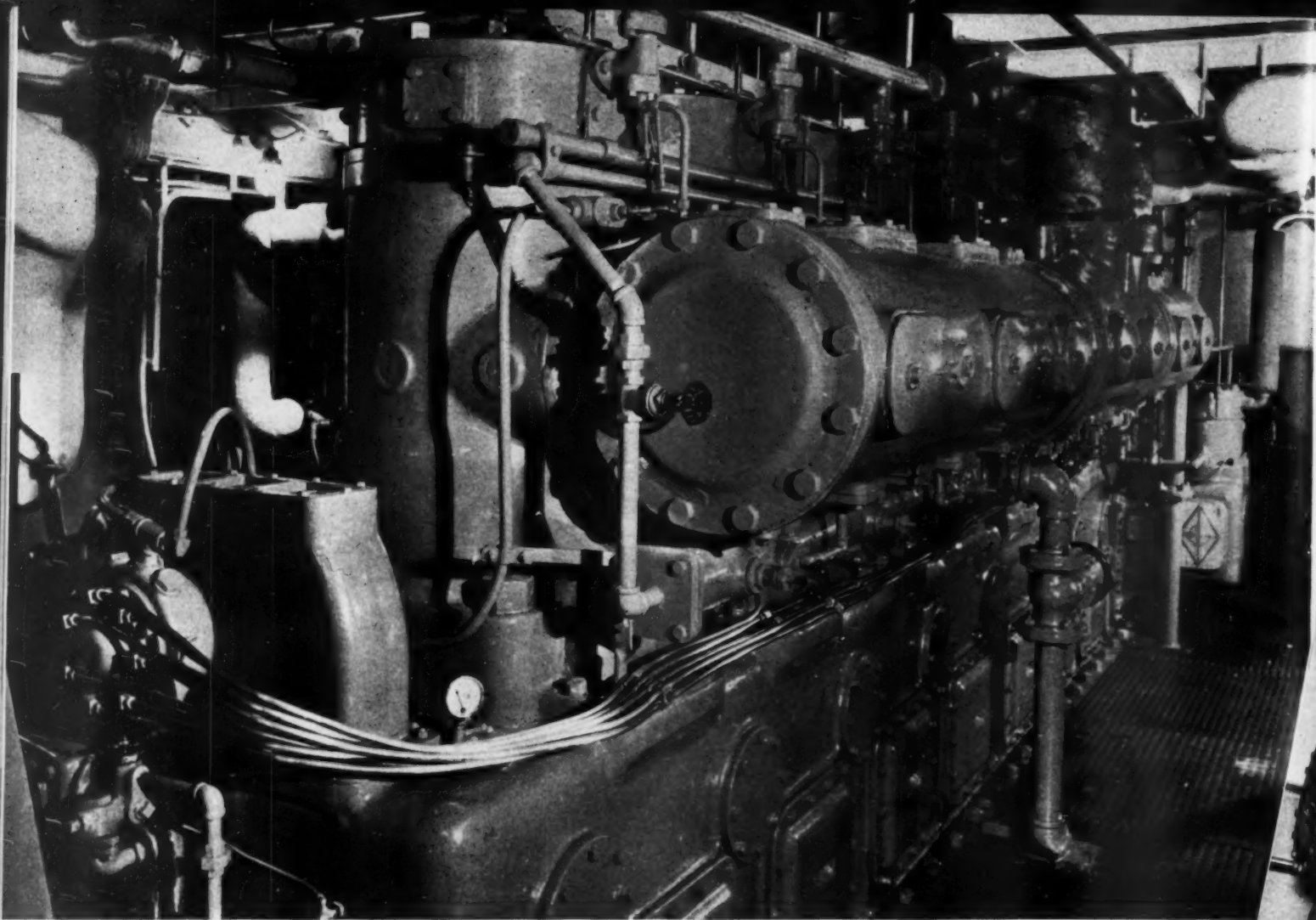
For instance, the typical Bushey galley and mess room on these new maritime tugs are the best. Located at the forward end of the deckhouse, the galley includes such quality units as an Elisha-Webb range equipped with Val Jean patent carburetor burner, Rex stainless steel refrigerator fitted with an outside tap which enables the crew to secure ice water for drinking purposes without entering the galley or opening the refrigerator.

The meals on board are taken on the combination table and cabinet covered with battleship linoleum, around which are six cast iron swivel chairs with brown leather seats and backs and chromium plated trimmings. Standard items such as drinking water cooler, steel dresser with lockers for galley utensils, wooden glass holder, dish rack, etc., are all there in ample though not wasted space.

These two units, together with the various auxiliary equipment are so located in the lower engine room as to provide maximum room for the engine crew, a condition that typifies all Bushey installations.

In addition to the regular auxiliary equipment built into the Fairbanks-Morse main engine, there are such familiar items as the stand-by pumping units for water and oil, a Roper 120 gpm. oil circulating pump and a 2" F-M pump for fresh water circulating driven by means of a 10 hp., 115 volt marine type motor. Other well known units in service on these tugs are the Milwaukee Refining Machines oil purifier, Schutte and Koerting water and oil coolers and Edison 20-tray 100 cell storage battery.

Also among the auxiliary machinery is found a good deal of Fairbanks-Morse pumping equipment. This includes a $1\frac{1}{4}$ " motor-driven,



Exhaust side of the Fairbanks-Morse, seven-cylinder Marine Diesel main propulsion engine.

The Captain's quarters are both luxurious and serviceable, lined and trimmed in walnut and teakwood, with Johns-Manville glass insulation. There's a large curtained berth, having built-in drawers, locker and shelf facilities, a good sized oak desk, built-in toilet cabinet, and rubber floor mats on battleship linoleum. The engineers' quarters for two has an upper and lower berth with built-in drawers, lockers, oak writing table. Desk Officers' quarters are very similar. Even the regular crew quarters with two in a room have the customary array of Bushey facilities that far surpass those usually found on tugs.

The pilot house is roomy and fitted with equipment especially designed to facilitate navigation. The 36" steering wheel is mounted on a brass stand, and readily visible is the Negus flat compass with mahogany binnacle stand, a Taylor mechanical type compensated barometer, a Weston engine tachometer, Seth-Thomas clock, speaking tubes and controls for the Sperry searchlight and gong system. The control switch for the steering gear has a Kirk-

land jeweled bulls-eye to indicate when it is in operation.

In the aft section of the pilot house is found a comfortable built-in oak bench with leather cushions, folding oak chart table and a set of chart racks above, while asbestolith deck covering is featured. The lining and trim is the same as found in the captain's quarters. The lining of the rooms in the deck-house is of Johns-Manville veneer backed by their glass insulation. In the upper engine room and on other necessary spots aboard, Johns-Manville acoustical veneer is also utilized. Steam heating is furnished to the rooms of the deck-house, captain's quarters and pilot house, with individual U. S. Radiators and a central oil burning boiler.

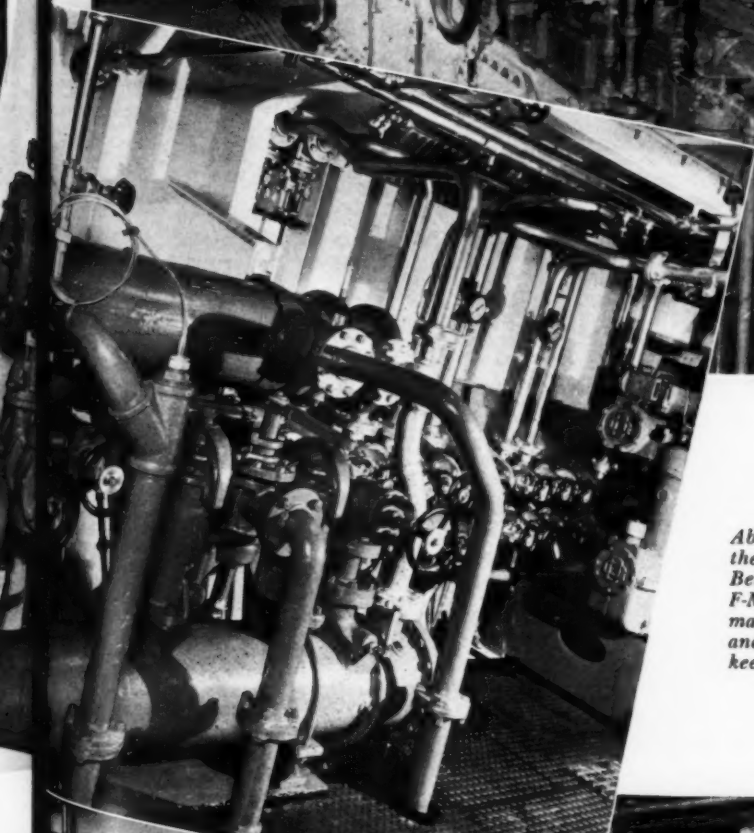
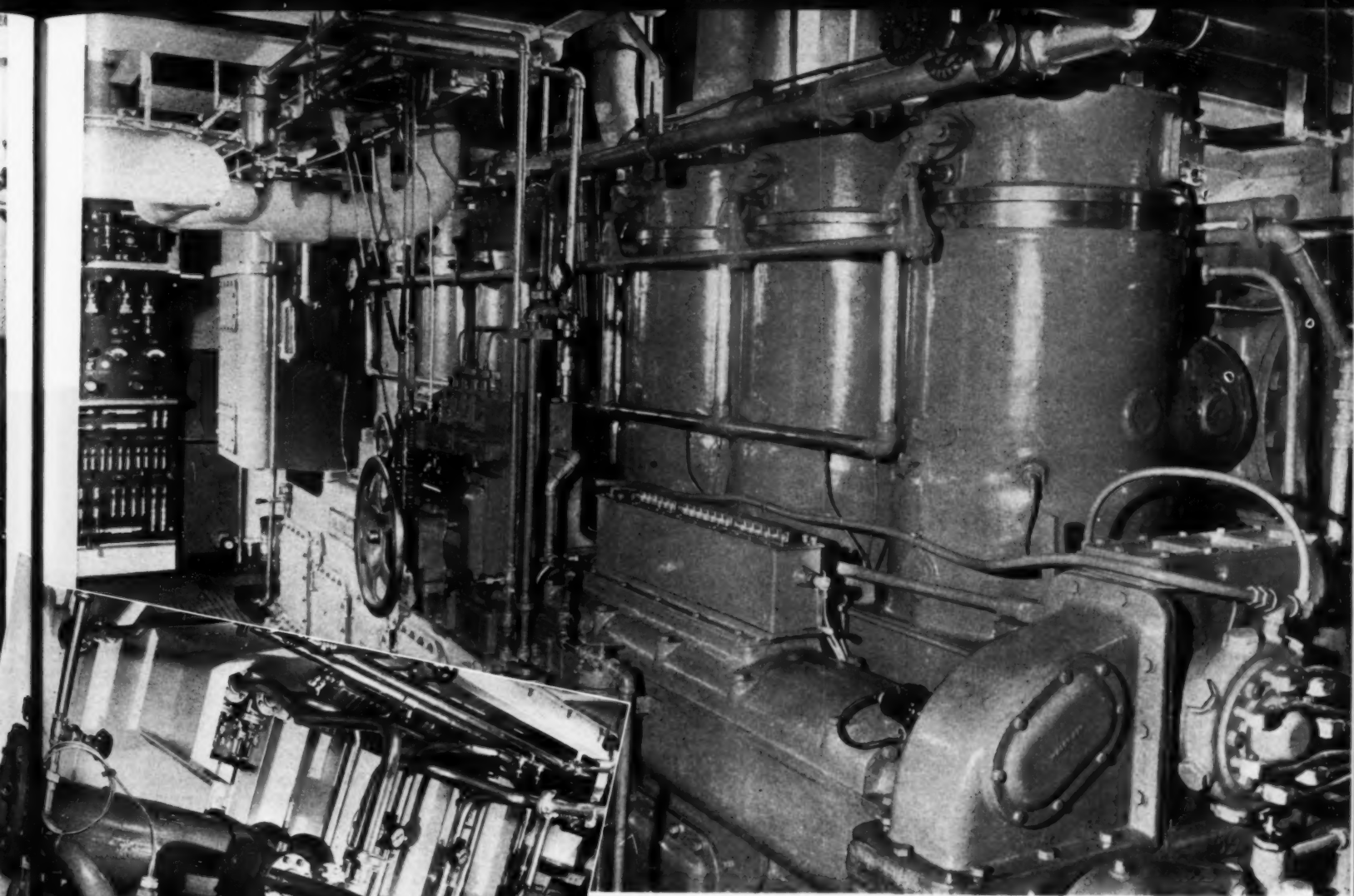
Supporting safety equipment essential to these tugs, includes the C-O-2 fire extinguishing system. Pyrene fire extinguishers, four of which are in the engine room and one each in the galley and pilot house, the two Foamite fire extinguishers, as well as hose, axes, etc. They

The compact group of Schutte & Koerting oil and water coolers and strainers.

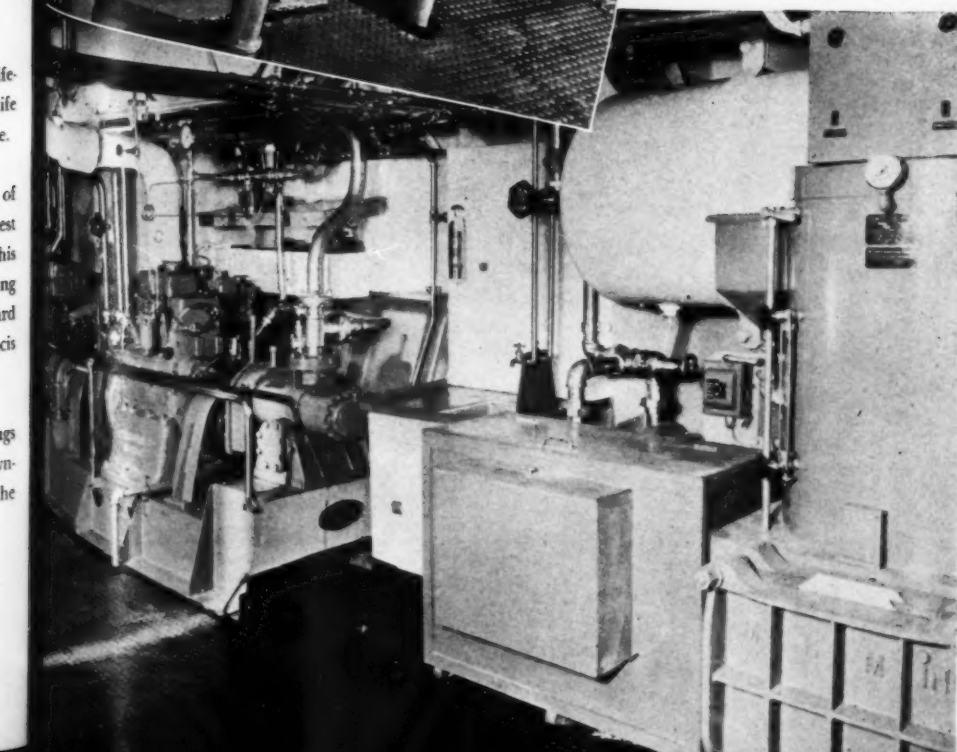
are also fully equipped with the latest life-saving and fog equipment, including two life floats designed for harbor and sound service.

This, then, is the description of the latest of the "Bushey-built" tugs—tugs which being latest are better than their predecessors for it is this continuous improvement of each succeeding ship built by the Bushey organization, toward which its dynamic, forceful president, Francis S. Bushey, strives.

What is the secret of building the kind of tugs that have made so many friends of their owners, operators and crews alike? Why do the



Above: Control side of the main F-M Diesel. Below: Seen left is the F-M Diesel engine marine auxiliary unit and right the Milwaukee lube oil refiner.



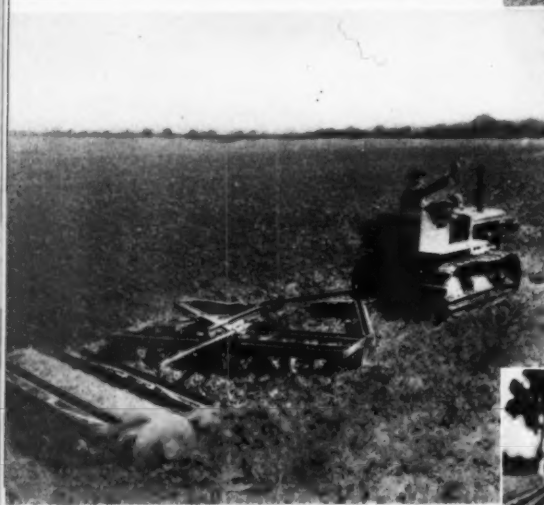
Busheys receive so many testimonials of commendation expressing amazement at their always prompt and efficient service or vividly pointing out the performance of one of the Bushey-built tugs doing herculean service? Perhaps it is because, as Francis says, "I don't work at building tugs, I play at it!"

And that is unquestionably the answer. Francis Bushey loves his hobby. His hobby is building boats. A man who loves his work (his hobby) will go far—and Francis, and Ira and Raymond have gone far in the business of boat-building. The fifty-odd, all-welded steel tugs plodding their various ways, performing their menial, but essential tasks daily in the harbors of New York and other parts, are a living monument to the ideals and vision of these sons of an illustrious father and their bustling shipyards.

Today the Bushey shipyards are busier than ever building tankers and tugs, for the winning of the war is no idle phrase to these three enterprising ship-builders who are putting in long hours of overtime as a part of their contribution to bring Victory as quickly as possible.

DIESELS DELIVER ON WAR FOOD FRONT

By F. HAL HIGGINS



↑ The operator of this Diesel tractor tosses a V-for-Victory sign over his shoulder as he harrows ground for sugar beet planting.

Caterpillar Diesel tractor pulling a 3-man cauliflower transplanter. Covers 20 acres a day. →



International Harvester developed this wheel type Diesel tractor especially for asparagus and sugar beet farms.



This transplanter, rolling on automobile wheels, sans tires, behind a Caterpillar Diesel tractor gets the job done in a hurry.



A self-propelled sugar beet harvester, powered with a General Motors Diesel.



THE food crisis facing the U.S. in this year 1943 may be heading the world into mass hunger that will make Pearl Harbor seem like only an incident. Leading agricultural engineers and farming experts who know their machine economics have been watching with wonder and consternation the handling of food production by men in Washington who seem not only to be ignorant of farm problems, but so naive they don't know they are choking off food production when the success of the war effort depends on increasing it tremendously. The same kind of inefficiency in high places that made Pearl Harbor possible seems so deeply entrenched in Government after a decade of planning it that way that a considerable decrease in production—from 10% to 20% under Government goals—is certain for 1943.

Now to the bright side of the U. S. food picture. Naturally, with the Diesel engine as power for agriculture leading the world in California, that is the world's most efficient food producer. It begins with a mere drop or two from Atlas Diesel engines set into Caterpillar 60, and Allis-Chalmers chasses by the former company late in the 1920s and early '30s when Atlas was nibbling at a new field that was beginning to urge manufacturers to heed their call for something to cut the cost in a post-war depression that burdened the farmer. Strange part of this hesitant venture by Atlas into the farm field is that their engines performed unheard-of feats of endurance and long life with low upkeep, but reorganization and change of

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ownership and management at this low ebb of industry turned that factory to the marine field and left agriculture, so far as tractors were concerned, to Caterpillar that appeared smack on the bottom of the depression with a Diesel tractor when the worlds of agriculture, logging, dirt moving, mining, oil field industries were all hanging on the ropes with red ink smearing their ledgers and officials tearing their hair to figure how to remain solvent.

From the first tractors with Diesel engines Caterpillar found it had hit the bullseye with an uncanny timing of product and market that in the next decade was to build a great chain of dealers each worth from a quarter million to a million dollars. Competition had to meet Diesel with Diesel or go out of business. So, all track-type manufacturers changed as rapidly as possible to this style of power: International developed its own engine, Allis-Chalmers finally settled on General Motors Diesel two years ago. Cletrac and Hercules continued to team up as those firms had done with gasoline for years before the Diesel engine was ready for the tractor. By the time war broke in the face of the West Coast farmer, practically all tractors from 30 h.p. up that were being bought by farmers were powered by Diesel engines. They had proved their cost-cutting ability from the first one in wheat, flax, rice, barley, vegetables, cotton, fruit and other farm crop operations. The canny sales managers of Caterpillar had worked out tables of savings on hours of operation of their gasoline and

Diesel tractors to prove that farmers with certain amounts of work to do couldn't afford to operate their old gasoline tractors when Diesels could be bought—and paid for with the savings in fuel! So, for several years they sold them as fast as they could turn them out as cost-cutters to the troubled farmers who were hunting sound methods of getting back to profits in their operations.

And that Diesel tractor in farm work swung a lot of changes that were revolutionary. The wheel tractors that did the cultivation and row crop work had to meet a rising track competition and so took to rubber to speed up their operations and cut costs by using less gasoline and lengthening life of tractor from less wear and breaking of tractor. Rubber then went onto the tools pulled by these tractors to reduce rolling resistance to all ground wheeled tools pulled and pushed by tractors across the rough terrain. That took less horsepower, so that smaller tractors handled loads formerly taking a size bigger tractor. Butane, propane and other fuels came into the picture as competition waxed hot—all to the ultimate effect of giving the farmer the widest range of fuels and the most efficient tractor farming in the world.

Your Old Reporter unhesitatingly states that no other farmer even approaches the food production efficiency of this West Coast Diesel-ized food producer. He has seen them all from Coast to Coast, in Canada and Europe.

But, when war broke and the Bureau Boys a Washington began planning it that way for food from the farms and ranches, things began to happen to slow down, hamper, bedevil and vex this highly efficient food producer. Suddenly, the Diesels for tractors were cut off with the stopping of tracktype tractor sales to farmers. With Diesel 40% of the h.p. on California farms by this time, that was a neat hurdle to production efficiency. Practically no Diesels are in wheel tractors—there were probably 200 built up by International Harvester for the asparagus growers and beginning to sell like hot cakes for California's heavy row crop work when war stopped that, too. Now, County Agents, agricultural engineers and farmers who keep costs had discovered that the Diesel tractors had cut their fundamental costs of farming in half. Figures from such sources from the Canadian border to Mexico began to appear by 1936 to show plowing, disking, harrowing, seeding and harvesting of grain, rice, flax, beans and such highly mechanized crops were being quoted by custom operators of Diesel tractors at just half the old rate quoted

by gasoline operators. Some real contribution to farm efficiency had resulted from the use of Diesel. It had literally lifted the farmer over the fence by his own bootstraps.

Now, this Diesel efficiency discovered by the farmers themselves did not stop with the big field crops mentioned above. It spread all through farm operations wherever the Diesel appeared and was put on any job that offered it enough hours work to pay for the additional outlay for tractors with such power. It cut costs in beef, mutton and wool, milk, sugar beets, hops, lettuce and so on through the list.

It was merely a matter of hours of work to be done by management that knew how to do it. And these farmers know how! Proof of that last statement comes from the novel *Grapes of Wrath*, which for the first time in history put the farmer into the Big Business class alongside Oil, Steel, Lumber, Railroads, and so on. Even now, we find a certain type of New Deal left-wing politician trying to divide the Farmer into two classes: the Big So-and-So who belongs to the Farm Bureau, Associated Farmers, Grange, etc., and the "real farmer" who is a share-cropper, renter and in debt up to his ears. It's the Big Town Long Social Gainer's attempt to discredit the successful farmer and build up a type of "underprivileged farmer" they can handle by hand-outs from Government treasury. But it's also a tribute to this California Diesel-using farmer that he is the symbol of this *Grapes of Wrath* slant on a farmer ruthlessly knocking down an Okie's home with his tracktype tractor.

The pictures the writer has snapped around over the West the past season or two will give an idea of the depth and breadth and power of this Diesel food producer who now values his Diesel tractor almost beyond price. Every Diesel tractor is kept running, say branch managers and their service managers. Outside of a few cases where contractors used to tear down an old Diesel to rebuild several more in a fleet of Diesels, practically every Diesel tractor ever sold is operating today—most of them night and day with shifts of operators crowding them along for more work than ever done in their crowded peace-time jobs. A few farm tractors have shifted over to construction work under war's stress. Owners and operators have found such shifts profitable and they could get parts easier as well as pay higher wages than the farm and ranch could afford. The Diesel in the meantime is building a great dam of orders for farming with war's end, because never have their qualities been so appreciated.

They keep two spray outfits and Diesel tractors, like this, busy day and night on the El Solyo, 800 acre fruit ranch.





Above: President Robert E. Friend of the Nordberg Mfg. Company, Milwaukee and Mrs. Friend just prior to the launching.

Upper right: President George B. Howell of the Tampa Shipbuilding Company graciously presenting a token of the Yard's appreciation to the sponsor, Mrs. Neita Oviatt Friend.

Below: The USS MAUNA LOA as she majestically went down the ways at Tampa at 4:30 P. M. on April 14, 1943.



LAUNCHING THE USS MAUNA LOA Tampa Shipyard Grows Up

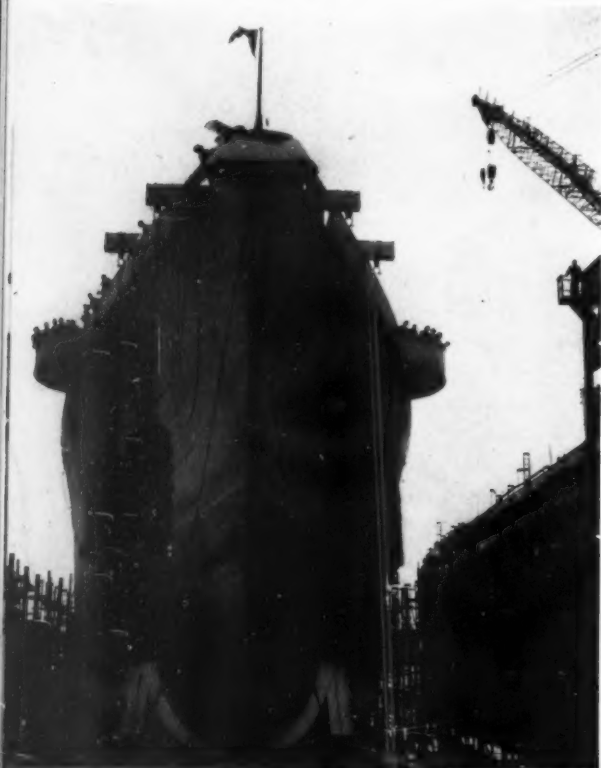
By REX W. WADMAN

TAMPA, Fla., April 14—Once again I stand here in the yards of the Tampa Shipbuilding Company on an important occasion, this time to witness the successful and efficient launching of the United States Ship *Mauna Loa*, an ammunition carrier, built for the United States Navy. The *Mauna Loa*, named after Hawaii's famous volcano, started moving down the ways promptly on the dot of 4:30 this afternoon when Mrs. Neita Oviatt Friend of Milwaukee, smashed the proverbial bottle of champagne on the bow. Mrs. Friend handled her job splendidly. The brief sincere speech she made just prior to the launching was an epic.

Mauna Loa is, in effect, a standard Maritime Commission Type C-2 vessel insofar as general specifications are concerned. Speed is, of course, a censored item. Power plant is the same as in a number of other Type C-2 vessels, namely a pair of 9 cylinder Nordberg Diesels rated to deliver approximately 6,000 shp.

I stood in this yard on July 23, 1940 and watched the Diesel ship *Sea Witch* being pre-

pared for her trials and in the August, 1940 issue of DIESEL PROGRESS I described those trials on pages 29-34. In many respects the *Mauna Loa* is a duplicate of the *Sea Witch* but I marvel, as I stand here, at the changes which have occurred here in a comparatively short lapse of time. In 1940 this yard was just getting started. It had some 1,900 employees who were struggling manfully to complete their first contract for six of these C-2 vessels with very little equipment with which to work. Today, as I look out from this platform over this tremendously expanded yard, I am told they now have 30,000 people working and that this is their twenty-third ship launching. Today the Tampa Shipbuilding yard is a modern, well-equipped, well-managed shipyard contributing splendidly to the War Effort not only in the speedy building of much-needed ships but also in the repair and rehabilitation of ships damaged in operations in the Caribbean and nearby waters. My congratulations go out to President George B. Howell and to Executive Vice-President Philip B. Brill for building in so short a time a marvelously effective weapon for beating the axis



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LONG RANGE DIESEL TUNA CLIPPER

By
A. W.
PONSFORD



Top view: The 80 ft. Diesel Tuna Clipper, "Monarch," built two miles from tide water at Long Beach, California. Above: Main engine is an 8-cylinder Superior Diesel. Valve covers and fuel injection nozzles are seen here. Left: One of the two, 100 hp. Superior Diesel auxiliary units with F-M generators installed on opposite sides.

MONARCH, new tuna clipper to join the San Diego long-range fleet is one of the most interesting of these unique, Diesel fishing craft. In the first place, her launching was a house-mover's job, for she was built two miles from tide water, at Long Beach, California. Secondly, the \$100,000 clipper is probably the strongest vessel of her class ever built, because, as her designer and builder, Frank Hodgson, put it, she is "As near to being a steel boat as a wooden one can be!" Lastly, the horsepower incorporated into her auxiliary machinery for operation of bait pumps, refrigeration plant, and general utility needs would have been considered sufficient ten years ago for a clipper twice her size.

Dimension are: Length, 80 ft.; beam, 22 ft. 6 in.; depth, 10 ft. 6 in. Like all modern clippers, *Monarch* features a raised forward deck extending aft until the secondary meets the stern bait tanks. Atop this is the pilothouse and master's cabin. The hull is of Oregon fir, reinforced with steel. All the knees are $\frac{1}{2}$ in. welded steel; there is a $\frac{3}{8}$ in. steel breast hook in the forepeak; frames are T-iron and the hull is further strengthened by 4 in. by $\frac{5}{8}$ in. straps bolted through to the skin. Engine bed is one piece, welded steel, and there are special steel knees and yokes on the hatch corners. Not con-

tent with this, the builder further strengthened his vessel with heavy timbers to give a rigidity not usually found in these clippers. Hull frames are of bent oak, spaced 10 in. on centers. More than 75,000 ft. of lumber was used.

Propulsion is by a 330 hp. 8 cylinder Superior Diesel, maximum 290 rpm. and direct reversing. The 5 in. shaft was specially treated with Monel metal. Hodgson developed the idea of spraying the shaft with Monel to insure longer life. He first did this five years ago with another fishing vessel, and a recent check showed no corrosion. The wheel is a Lambie, 69 in. with 53 in. pitch.

The pay cargo capacity was designed for 100 tons carried in a series of wells and deck tanks, in a semi-dry state, this, too, being an innovation and a compromise between heavy brine refrigeration and the "dry" system.

Two 100 hp. 4 cylinder Superior Diesels are installed on opposite sides of the main engine, these being direct connected to 80 kw. Fairbanks-Morse generators. All three Diesels are cooled with fresh water, and all motors and pumps are Fairbanks-Morse. The refrigeration system was designed by the builder and installed by the Baker Ice Machine Co. The basis

of the plant is a three-unit set-up mounted in the auxiliary engine room directly above the main. The compressors are $4\frac{1}{2}$ in. by $4\frac{1}{2}$ in. 4 cylinder Bakers driven by 25 hp. motors. All fish wells and tanks are equipped with galvanized coils. These coils generously encircle the compartments so that, if needed, there will be sufficient chilling to carry the cargo dry, and at very low temperatures. Operating the circulation system are a series of centrifugal pumps, these placed in the shaft alley, which is 3 ft. 4 in. wide and easily accessible to the engineers.

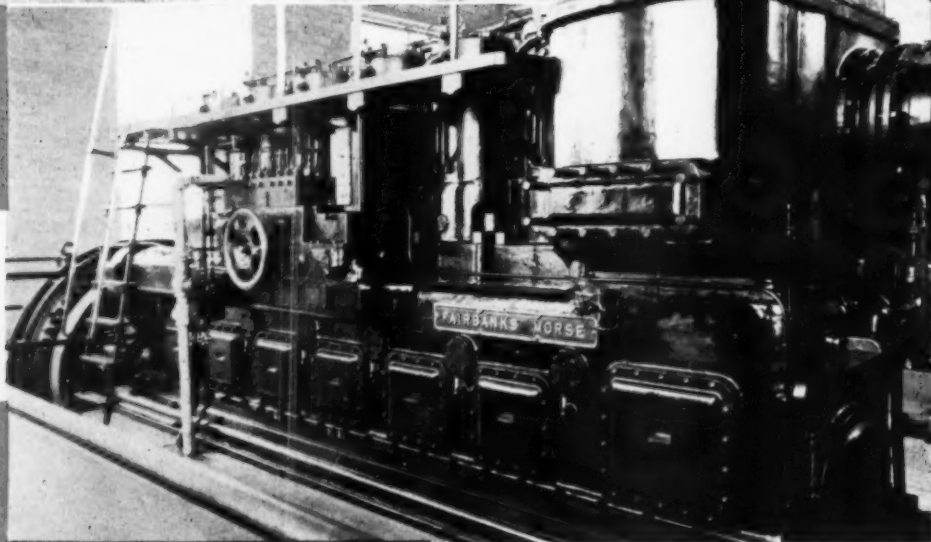
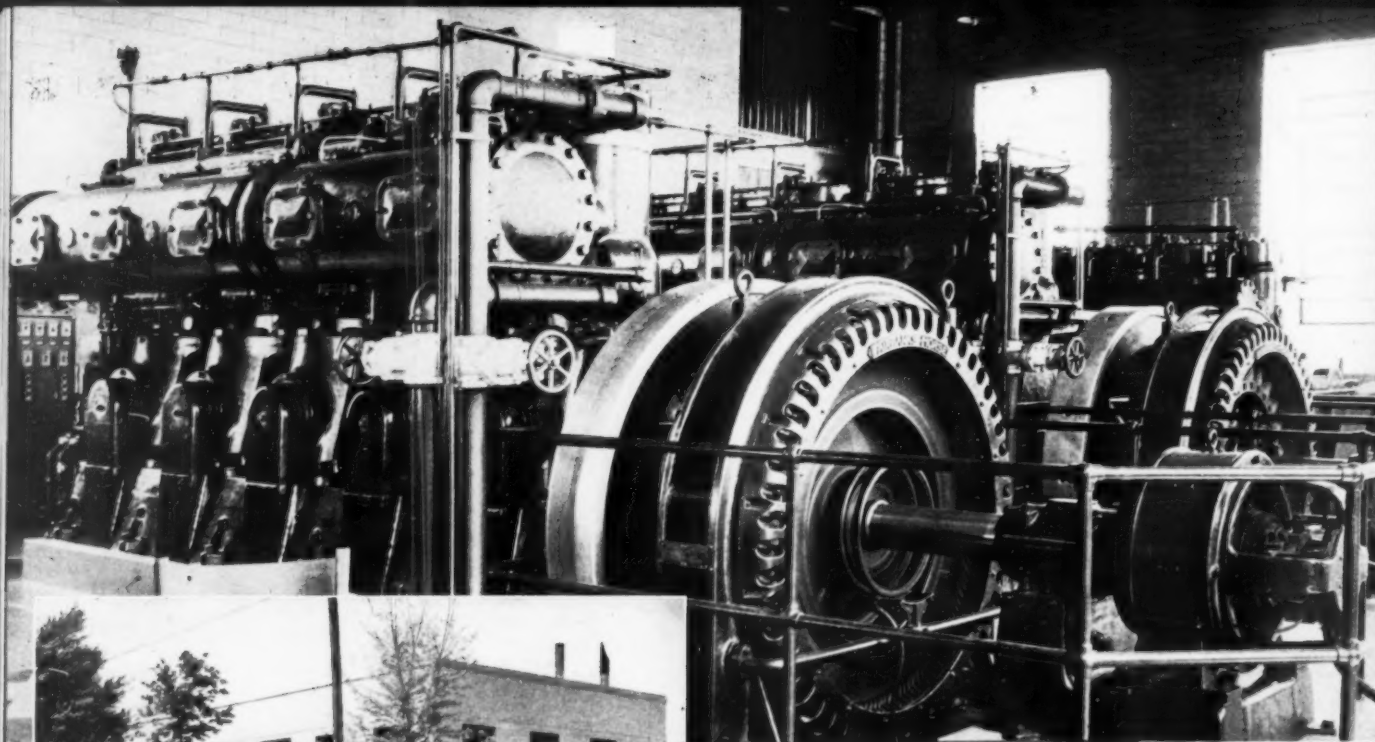
Bait pumps are two 6 in. suction, vertical type, F-M make, driven by 10 hp. motors. Each has a capacity of 1,100 gals. per minute, and draw water from a deep intake. Bait is stored not only in the deck tanks but also in several of the wells, and some 125,000 live lures can be carried. Bait lines are laid beneath the shaft alley for greater convenience.

For service in tropical waters off Central America, the vessel has a well-designed ventilating system. The engine room is equipped with a dual fan system, driven by two $7\frac{1}{2}$ hp. motors which force hot air into an outlet from which a suction fan expels it into the stack.

The *Monarch* has an exceptional cruising range for a vessel of her size. Bunkerage of 10,000 gals. is provided. A steel tank forward holds nearly 4,000 gals., and there are two tanks of 2,500 gals. capacity amidships, and another at the stern. She also carries large lube tanks and fresh water capacity of 1,000 gals. Under normal conditions the clipper can cruise to the Panama Canal, engage in several weeks of fishing and return to port without refueling.

Accommodations are planned for a crew of twelve, but ten will be normally carried, including the master. All sleeping quarters are found on the secondary deck, although the well-appointed galley is located amidships on the main deck.

Owners of the clipper include, the builder, Frank Hodgson, Richard Oliver, Alfred Brum, and Antonio Rodriguez, all experienced tunamen, even the designer having had long service in the Southern California fleet, his last vessel being the *Azoreana*, on which he was engineer. Built on leased land at Terminal Island, the hull was then moved two miles down a public highway to the ways of Fellows & Stewart, where she was floated down Cerritos Channel to the new Hodgson yard at Long Beach. The operation was claimed to be the longest haul of a large boat in the history of Southern California shipbuilding.



Center view: Exterior of the 2130 hp. Zeeland, Michigan, power plant. Above: One of two 690 hp. F-M Diesels in this plant.

Honan-Crawford which reclaims oil from the two 690 Diesels.

One Plant and A

electric power. In March, 1937, the plant, and a unit was put into service near Zeeland.

We have already mentioned here and there by no means auspicious, the cents per kilowatt over 200. For drops down to ice, Zeeland of the Diesel engine failure power. That chicken hatch service Zeeland.

Obviously, no Zeeland citizen economical power. Diesels produce kw. hrs. and fuel. To be kw. hrs. per gallon factor of 62 was \$21,752.1 2,538,100 kw. revenues at \$ able to pay operating expense, making and depreciation profit of \$15,9

Zeeland is one that entered the an adequate units, each direct volt Fairbanks connected exciter, and it is comm

Top, left: Three of the four Fairbanks Morse Diesels and generators; upper center in this view is seen the Yates-American radiator which cools lube oil and jacket water for one 690 hp. engine. Above: Scraper ring oil is cleaned in this Youngstown-Miller purifier.

emplified in a modern municipal Diesel generating plant. Perhaps windmills would be more picturesque and in keeping with the names on the mail boxes, but Zeeland's thirty chicken hatcheries, woodworking plant, homes, and commercial establishments demand a prime mover less fickle than the wind. A 2,130 hp. Fairbanks-Morse Diesel plant was the answer—and a profitable answer it is.

Prior to 1937, this community of 2,700 population was served by a private utility. Rates were a little higher than the good citizens wanted to pay and service did not live up to their desires. It was decided to embark upon municipal ownership of power facilities and the decision was quickly translated into a two-engine power plant. These first units, identical 375 hp., 5 cylinder, 14 in. x 17 in., 300 rpm. Fairbanks-Morse Diesels, were put into service in November, 1937. The municipal plant provided excellent service at low rates and consumption of

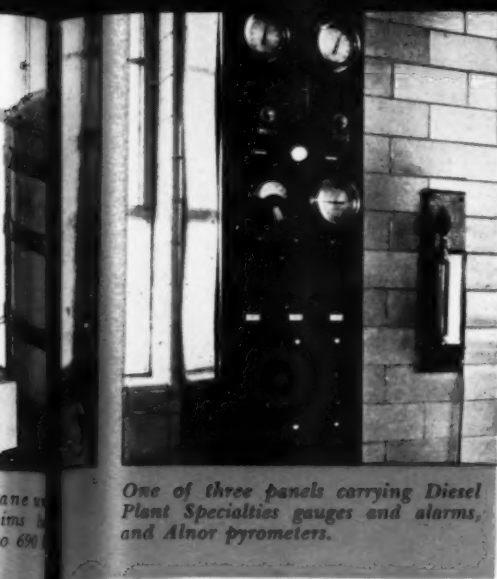
DIESELS

MATCH

DUTCH-AMERICAN

THRIFT

By WM. H. GOTTIEB



One of three panels carrying Diesel Plant Specialties gauges and alarms, and Alnor pyrometers.

electric power expanded tremendously. In March, 1939, a 690 hp., 6 cylinder, 14 in. x 17 in., 300 rpm. F-M Diesel was added to the plant, and in March, 1941, a second 690 hp. unit was put on the line. Thus, in four years, Zeeland nearly tripled the size of its plant.

We have already hinted at the cause of expansion—here are the details. The utility rates were by no means exorbitant but under the city's auspices, the domestic consumer pays only 4 cents per kilowatt-hour for the first 50 kw. hrs., 2 cents for the next 150 and 1.5 cents for all over 200. For off-peak water heating, the rate drops down to 1 cent per kw. hr. As for service, Zeeland can have no peer. In the history of the Diesel plant, there has been not a single engine failure, not a single interruption of power. That's the kind of dependability a chicken hatchery requires. That's the kind of service Zeeland voted to install.

Obviously, no plant could support the rates Zeeland citizens enjoy without efficient and economical power production. In 1941, the Diesels produced a little more than 2,500,000 kw. hrs. and consumed about 215,000 gallons of fuel. To be exact, the return for fuel was 11.62 kw. hrs. per gal. with an average operating load factor of 62 percent. The total expenditure was \$21,752.10 for an actual production of 2,538,100 kw. hrs. or 8.57 mills per kw. hr. With revenues at \$60,086.45, the power system was able to pay operating, distribution and general expense, make a liberal allowance for interest and depreciation, and still show a clear net profit of \$15,921.29.

Zeeland is one of the fortunate communities that entered the period of war emergency with an adequate reserve of power. The 690 hp. units, each direct-connected to a 475 kw., 2400 volt Fairbanks-Morse alternator with direct-connected exciter, are the backbone of the plant and it is common to find one of their engines

operating on a twenty-four hour schedule. Each of the smaller engines, rated at 375 hp., drives directly a 250 kw. F-M alternator. With the maximum peak at 710 kw., it is possible to carry the load with one large engine and one small engine leaving two duplicate units in reserve. Before the installation of the last engine, the plant could not have carried its peak load if the 690 hp. unit were out of service. Sound power policy demanded more surplus generating capacity.

The original engines are two-cycle, mechanical-injection, crankcase scavenging Diesels, a unit widely used in municipal and industrial plants. The big engines are two cycle, mechanical-injection Diesels.

The closed cooling system is one of the features of this carefully designed plant. The water circuits of the two 375 hp. engines are hooked together and soft water is circulated by two F-M motor-driven centrifugal pumps through the engine jackets and a Yates-American radiator where it is cooled by two fans driven by 10 hp. variable-speed motors. In the case of the 690 hp. units, Yates-American radiators cool both water and lubricating oil. For the first, two radiator units were provided for water and two for lube with a 5 hp. fan on each of the four radiators. The newest engine is served by a large double-circuit radiator which handles both water and lube with a single 10 hp. fan for both. Each big engine has an F-M motor-driven centrifugal pump to circulate cooling water. Makeup water is treated in a Graver softener. All the radiators are arranged with adjustable louvers so that the plant may be heated in winter and the hot air drawn out in summer.

The plant's performance record testifies to the efficacy of lubrication. Sinclair Rubilene is used on engines 1, 2, and 4, and Standard Oil's DTE on No. 3. An average of about 4,000 rated horsepower hours per gallon of lube was reported for 1941. Wear is small and rings run free. Activated clay purifiers keep the oil free of harmful elements. A Honan-Crane purifier in continuous operation takes oil at 25 lbs. from the big engine pressure circuit, cleans it and returns it to the crankcase. Oil picked up by the wiper rings drains to a tank in the basement and is cleaned once a day in a Youngstown Miller purifier. To summarize, the picture of the big engines' lubricating system shows oil flowing under 25 lb. pressure from a pump driven off the crankcase to the bearings up into the pistons to cool the piston crowns, through a Schutte & Koerting screen filter, the radiators for cooling and back to the pump. Meanwhile

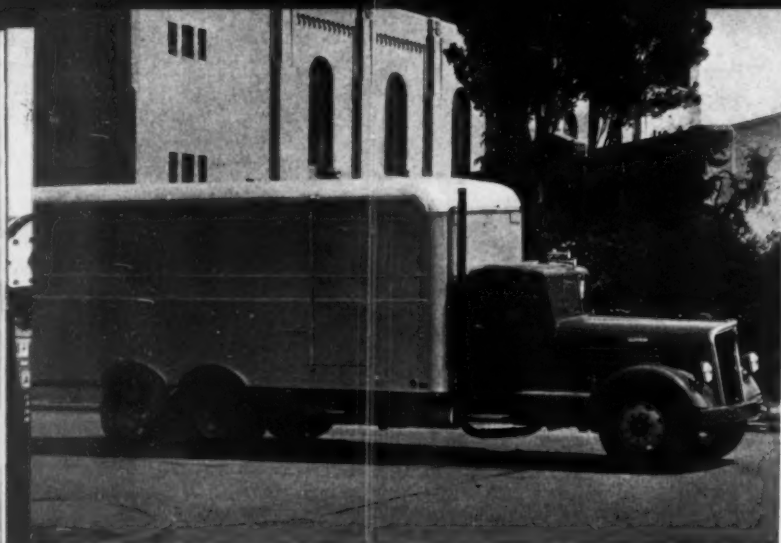
part of the oil, under the main pump's pressure, flows to the purifier and back to the crankcase. Cylinders of all the engines are supplied with lube by Madison Kipp mechanical lubricators.

A 32 gravity Michigan fuel supplied by the Leonard Refining Company is unloaded from tank trucks by an F-M motor-driven gear pump into two 10,000 gallon tanks resting on concrete cradles near the plant. The fuel flows by gravity to two 300 gallon and two 600 gallon day tanks in the basement where it is picked up by the engine supply pumps and delivered to the F-M injection system. The quantity of fuel injected is regulated to meet the load conditions by a Woodward Type IC governor for each engine. There is a meter at each day tank and a Nugent filter between day tanks and each engine. The last major source of engine fouling is blocked by American impingement-type air filters in concrete houses at the rear of the plant, permitting only clean air to reach the Diesels. Exhaust gases from engines No. 1, 2, and 3 vent through vertical Maxim silencers outside; a Burgess snubber, similarly placed, was provided for No. 4. Starting air is supplied by two 250 lb., 3¾ in. x 3¾ in. F-M compressors and stored in five Pressed Steel tanks. One compressor is V-belted to a motor, the other to a gasoline engine.

Superintendent Percy Carlton and his three operators believe that a trouble-free municipal plant demands alert supervision. In this they are assisted by three conveniently placed Diesel Plant Specialties alarm panels which hold Alnor pyrometers, Marshalltown pressure gauges and motor controls.

The power system is managed by Mayor Nicholas A. Frankena and the Board of Aldermen: John Bouma, president pro tem; John Ozinga; Nelson Van Koeving; Peter H. Karsten; William Van Eenenaam; Matthew Lookers; with Gilbert J. Van Hoven as Clerk and Nick Tanis as Treasurer. Messrs. Karsten and Van Eenenaam constitute the Public Property Committee which has direct jurisdiction over plant operation at Zeeland, Michigan.

These Zeeland Dutch-Americans are proud of their attractive buff colored, smooth brick, power plant with white stone trim and the beautifully landscaped grounds that surround it. But their appreciation of the plant is not wholly aesthetic. These are thrifty people. They like the service the plant gives and the rates they pay, and the balance in the bank at the end of each year, three thrifty features.



This smart Kenworth truck, powered with 150 hp. Cummins Diesel, is equipped for fast over-night deliveries of perishables under dry ice refrigeration.



A heavy-duty truck and trailer with Cummins Diesel engine unit which covers four West-Coast States carrying perishable loads under mechanical refrigeration.

TRUCKS roar out of the night, blinking their lights in passing. It's a case of feeding the schedule to her every minute to keep the "reefers" on the point over the heavy hill-runs of Washington, Oregon, and California. Behind every wheel there's an ace driver and another wedged in the bunk, rear and high, getting some "shuteye" before it's time to take over.

They're on the southbound out of Seattle, Washington, for Los Angeles, California, with 1,265 miles of coast and inland routes to thread with their refrigerated highway train of Diesel tractor and semi-trailer, or Diesel truck and trailer, carrying better than thirty tons of fresh or frozen fruits and sea foods out of the Pacific Northwest for points south of the Tehachapis. With the 35 mph. speed limit now in effect, the boys roll 'em every mile through coast dimouts, blackouts, and county-line "bug checks" with one eye on the watch and the other on their mental road map. They know they can't make up time on a 35 mph. schedule with the speed limit the same.

These "reefer runs" are a big percentage of the truck tonnage that roll across State lines in and out of Los Angeles. And, for those that like a few statistics with their reading: during one week 138 loads, totaling 3,822,360 pounds, made runs of 750 miles to in excess of 1,500 miles. This was an average of 1,125 miles per load of approximately 30,000 pounds, and every one had a popular make of Diesel engine installed.

And here's something more of interest, comparatively: A test week in 1942 showed a total tonnage increase of 73.6 per cent; ton miles, 110.8 per cent; truck miles, 21.4 per cent; efficiency, 30.4 per cent over the same for 1941. This was due to voluntary effort on the part of carriers in support of the war effort, and before

the effective date of the O.D.T. orders requiring 100 per cent capacity loads.

A popular example of the modern refrigerated truck line and one of the pioneers is the Colletti Fast Freight with seventeen insulated units that are adaptable to either cold-conditioned shipments or straight merchandise and bulk cargo commodities.

With their own terminals in Seattle, Portland, and Los Angeles, they offer a fast door-to-door service that has shown a 900 per cent tonnage increase in the last two years with overhead cost the lowest in their long years of operation, due to planned, expert maintenance which keeps the units on the necessary schedule with road failures at a minimum.

This important department is under the immediate supervision of J. J. Hendricks, mechanical superintendent and former owner, and operator of the refrigerator line once bearing his name, but now the Los Angeles-Seattle Motor Express, running intermediate schedules with the Colletti Fast Freight. The transportation and traffic departments are in charge of

DIESELS ROLL WITH "REEFER" LOADS

By JIM MEDFORD

J. J. Hesselbrock, general manager, and the two make a good team, both being practical men with many years of fast truck service experience. The Colletti transport equipment includes two distinct types: Diesel tractors with mechanical refrigerated, 35-foot semi-trailers; and cab-over-engine trucks, with trailers using either dry-ice or wet ice, depending on cargo.

The mechanical refrigeration in the semi-trailers is supplied by Thermo-King units fitted into the bull-nose, close against the roof, for proper circulation by placing the heavier cold air over top of load and blowing it to the rear, where it falls and moves forward under the slatted false floor following behind the rising lighter warm air at front of load that is cooled and recycled by the inside evaporator and its blower. The part of the unit outside the trailer consists of metal frame holding condenser, air-cooled gasoline engine V-belted to air-cooled methyl chloride compressor, and fuel tank mounted on top. All is thermostatically controlled. Starter and ignition battery is located under the unit with main and starter switches on side of the unit. Close to this is the load

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A Cummins Diesel cab-over-engine truck and trailer unit equipped for long, fast hauls of refrigerated fruits, vegetables, and sea food.

temperature recorder. Inside temperature is held at a maximum of 15 degrees F. These semi-trailers are divided by a insulated bulkhead dividing interior into 40/60 per cent compartments should all space not be refrigerated.

The trucks and trailers are refrigerated with dry-ice for frozen berries, fruits, and fish. Slabs of the dry-ice two inches thick are placed on top of the load tightly enclosed with heavily quilted covers. A charge of 500 pounds is sufficient for 1,000 cu. ft. of cargo space and holds interior below 15 degrees F.

The appearance of these vehicles is highly attractive — natural finished aluminum with bright red lettering. The interior, next to outer skin, is lined with metalation paper, and 2½ inches of spun glass is packed between the paper and the inner skin of highly waxed plywood. Floor is sheet metal over wood with slatted wooden sections holding cargo off floor for good air circulation, particularly necessary with dry-ice refrigeration. Northbound, the cargoes are 67 per cent defense materials, the balance general merchandise.

But southbound, it's fresh and frozen fish, chilled oysters, and crabmeat, frozen berries, fruits, and vegetables. The fresh fish—salmon, fillet of sole, halibut and rock cod—are packed in crushed ice and shipments are re-iced at Redding and Sacramento, California. The units carry 18,000 pounds of fresh fish or 22,000 pounds of frozen fish, wet ice with the fresh fish making up the difference in cargo tonnage.

In Seattle, a pick-up service gathers the sea foods from points on the waterfront for loading the mainliners at the terminal. A considerable portion of the oysters are from Bellingham, Washington, and the third day, after harvesting, the bivalves are on southern city tables. They are easy to handle, as chilling is all that is necessary to retain valuable ocean freshness. The frozen fruits and vegetables, including berries, have to be held at the low temperature of 12-13 degrees F. to avoid start of defrosting. They are packed in boxes, cartons, and cellophane wrapped packages, also in cartons. Individually frozen before shipping, they come through in excellent shape. Bulk shipments are frozen solid in barrels for various purposes, the slight mashing in no way injuring the contents. Refrigeration for holding the barrel shipments is sufficient at 25 degrees F.

Connections to and from Alaska, British Columbia, and Western Idaho are made at Seattle. Pick-up and delivery service is part of the Colletti Fast Freight policy at all terminals. And, because of their agencies at all intermediate points, this gives an all-around service that has been instrumental in building up their refrigerated truck service by enabling small dealers enroute to participate in direct delivery from packing plant to store door, eliminating warehouse storage cost.

The Colletti Fast Freight trucks and tractors are Kenworth six-wheel, dual drive, and are powered with Cummins 150 hp. Diesels. The dual drive is a real safety factor on these long

reefer hauls because, by dismounting one drive in case of failure, the other will get the job into terminal with a minimum of road delay. The units make an average of five round trips per month, a total of 12,650 miles. Lube oil is reclaimed, S.A.E. 30, which was given severe road and laboratory tests before adoption by the mechanical department. It is changed at the end of each one-way trip of 1265 miles and shows a use of 1¾ gallons at a cost of 25 cents per gallon. Fuel viscosity is 27-plus with pump set at 32-cc.

Since the establishment of the 35-mile speed limit, drives have been fitted with new gears of 6 to 1 ratio replacing the old 5 to 1 ratio, permitting engines to turn at 1,600 to 1,700 rpm., thus maintaining their efficiency and overcoming the problems that would result from running constantly at lower rpm., as would be the case with the lower ratio gears. Engine temperatures are held between 140 degrees and 160 degrees. Major overhauls are given at 80,000 miles, and operating cost is approximately 14½ cents per truck mile.

Other refrigeration truck lines using Cummins in Kenworth trucks are numerous. Two of these are the System Freight Service, one of the largest operators, who cover a wide area in addition to the coastwise run; and the Interstate Motor Lines on Tri-State service in Washington, Oregon, and Idaho. The System Freight uses all types of refrigeration including mechanical. The Interstate has a number of trucks especially built for dry-ice use.

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GM DIESELS provide power for a big part of America's undersea fleet—not alone for propulsion, but for the vital auxiliaries as well. • Furnishing this dependable power for our submarines is perhaps **OUR GREATEST CONTRIBUTION TO THE WAR EFFORT**

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ENGINES 15 to 250 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

LOCOMOTIVES ELECTRO-MOTIVE DIVISION, La Grange, Ill.

Two Types of Mechanical Failure

By R. L. GREGORY

MANY Supervisors and Operating Engineers in Diesel plants have experienced occasional failures in equipment, during operation. In these experiences they have learned that these failures may be divided into two classes, both of which present problems of varying degree. These failures may be classified as "Conventional" or anticipated failures, and as "Unconventional" or unanticipated failures. It is the purpose of this article to discuss briefly these two types of failures and the problems which they present.

The "conventional" type of failure usually occurs to parts of the unit, which are subjected to the most wear, tear and strains. A good engineer being forewarned of such conditions is forearmed and prepared to meet the usual problems encountered in a conventional failure. As an example let's take the following:

(a) Under our present demand for output, most of our Diesels are required to operate

continually for weeks or even months at a time, with a minimum outage for maintenance. Suppose that you are operating a unit on such a schedule, taking hourly readings and making hourly rounds of inspection to see that operating conditions are normal. Such a round has been completed, load conditions noted, temperatures charted, etc., and to all appearances all operating functions are proceeding normally. Then out of a clear sky, upon your next round you discover that one piston or cylinder of the unit has suddenly developed higher temperatures than the rest. You are immediately aware that some condition has changed which has not affected all pistons, but this particular one. Perhaps the cooling system or lube oil lines have become plugged, the lubricator has stopped functioning properly, or blowby has suddenly occurred and you are faced with the problem of correcting it. This condition is not to be unanticipated, since the unit has been in service for sometime, and you are aware that the wear and tear on piston rings is not uni-

form on all members of the unit. If the load conditions are such that it can be done, undoubtedly you will cut out the fuel pump to this one piston, immediately noting whether this particular cylinder and piston is getting the proper amount of cooling agent. If it is and the temperatures start to decrease you can almost safely assume that blowby is causing your trouble and that it will be necessary to pull the affected piston for an inspection of the rings.

Knowing that such a condition can and may arise, the engineer is prepared for this emergency by having materials and tools available for a quick repair job.

(b) As another example take the case of an air injection unit, where the blast is furnished by a three stage compressor. Those having experience with such units, know that it is a conventional happening to have a discharge or suction . . . And now please turn to page 54 . . .

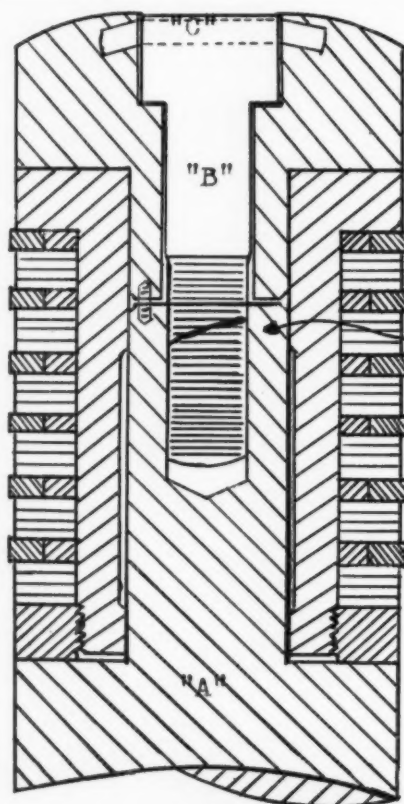


FIG. 1.

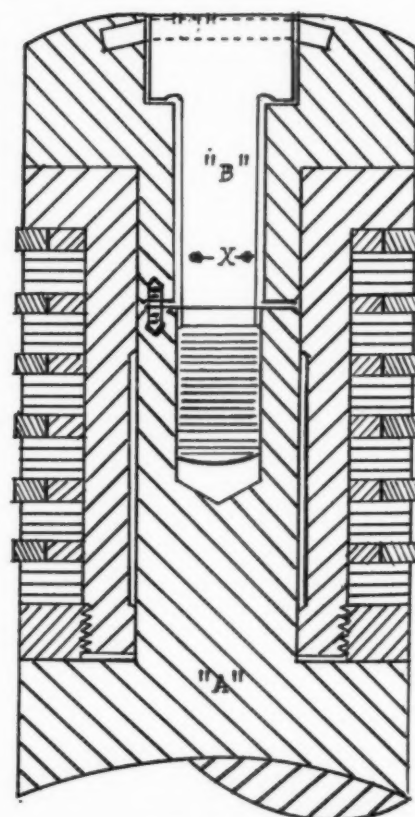


FIG. 2.

STRIKING POWER

abroad needs Diesel power at home. For lubrication and compression seal that develop full DIESEL output use . . .

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Rubilenes give protection that increases service hours, reduces ring and liner wear and keeps overhaul costs low.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

3 WORTHINGTON DIESELS and direct connected generator sets in plant of West Michigan Electric Cooperative, Scottville, Mich. Lubricated with Rubilene Medium Heavy since starting in Oct. 1941.

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Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

"An Easy Method of Cleaning Heat Exchangers and Coolers"

Contributed by
C. W. JENNINGS

ONE of the most tedious tasks which most engineers encounter in the maintenance of their Diesel Equipment, is the periodical cleaning of the heat exchangers and oil coolers. We found it so in our plant, because our practice had been to remove the bundle from the heat exchanger, and place it in an immersion tank, filled with a cleaning solution. After letting it soak for several hours we would then remove it and thoroughly wash it and clean off the loosened scale, etc., then replace it in the shell. Removal of the bundle always constituted a laborious and lengthy procedure, and we therefore concluded that we could obtain just as satisfactory results by some other method.

If we could leave the bundle in the shell and

clean it as effectively we felt that a great deal of time and energy could be saved, and we therefore devised the following method of cleaning, which has proved very satisfactory and which should be of interest to the readers of this section. I was a little skeptical of the reaction of the cleaning solution on the rubber gaskets used in the shell, and in order to convince myself of this reaction before going to the work of constructing this equipment, I took some of the rubber gasket material and immersed it in a strong cleaning solution for some time. It did not affect the gasket material in any way so I proceeded in arrangement of the material.

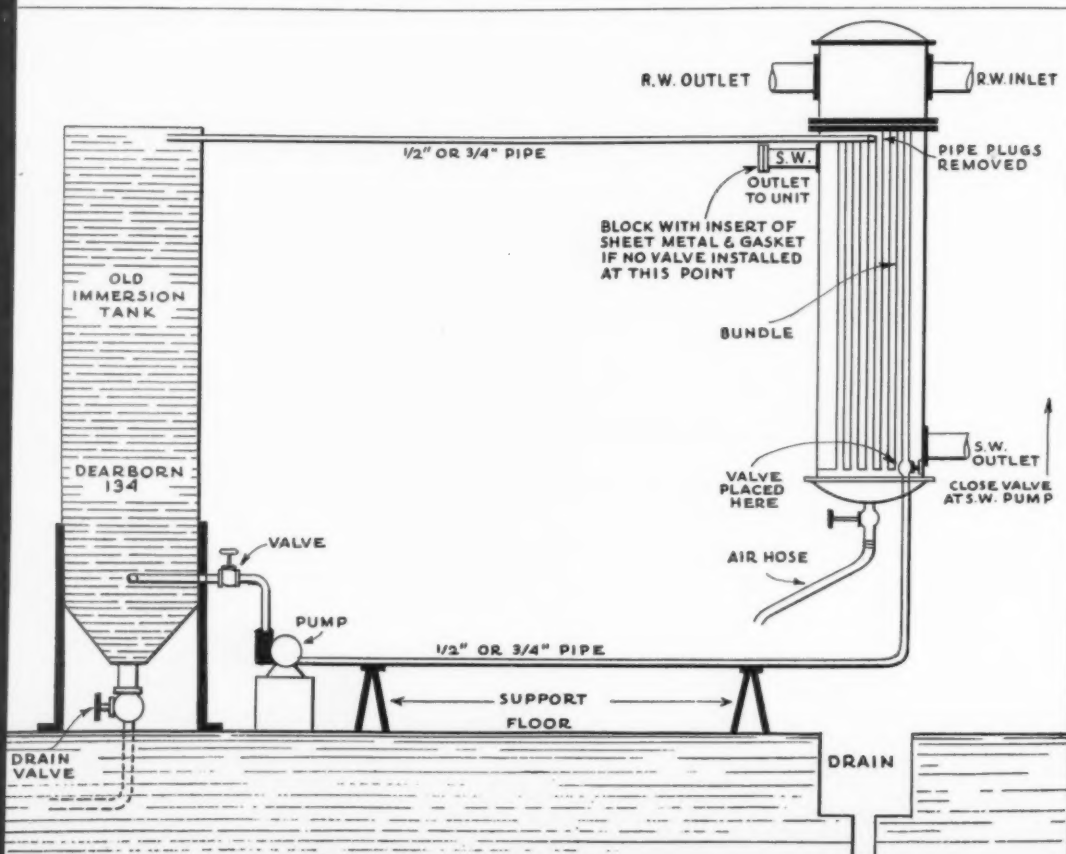
I used the old immersion tank and piped it to the shell of the exchanger as shown in the sketch. Removing the top pipe plug of the heat exchanger shell, I ran a pipe from this point to the top of the immersion tank. Then from the bottom of the exchanger shell, I also removed a pipe plug and connected the discharge side of the pump, as shown, at this point. The suction side of the pump I attached to a bottom connection of the immersion tank. To the drain cock of the exchanger shell I attached an air hose fitting so that compressed air could be applied to the shell while circulating the cleaning fluid.

With the circuit completed as to piping, using a small gear driven pump operated by $\frac{1}{4}$ hp. motor as the circulating medium, I partially filled the exchanger with water, and in our case added 5 gallons of a commercial cleaning solution. Then I filled the heat exchanger until the water and solution just covered the bundle of tubes, the solution equalizing itself in the immersion tank. I then started the pump, and let the solution circulate up through the bundle, back into the immersion tank and on to the heat exchanger again.

In order to agitate the solution while passing through the tube bundle I applied a small stream of air by opening up the drain cock at the bottom of the heat exchanger where I had attached the air hose connection. This agitation helped to clean the tubes in the center, which were the hardest to get at in our old method. After agitating and circulating the solution through the exchanger for about $\frac{1}{2}$ hour I drained the solution off through both the drain on the immersion tank and the drain of the heat exchanger.

I then washed the heat exchanger thoroughly by removing the top cover to remove all the solution which I could, washing it first from the top and then back washing it from the bottom to insure removal of the chemical. One point to be watched is that not any of the chemical passes from the heat exchanger into the engine or back into the pump. In the majority of cases valves are placed at the soft water outlet to the engine and between the soft water inlet and the pump. These should be closed before starting the cleaning process. If there are no valves at this point, break a flanged connection close to the heat exchanger, and insert a thin metal plate with a gasket at each point, thus blocking off the outlet and inlet pipes from the heat exchanger shell.

One added point should be mentioned. Any cleaning solution, powerful enough for such a job, should be handled very carefully. Since it requires a strong chemical to obtain satisfactory cleaning results, these solutions are injurious to the skin and eyes and care should be taken that none of it comes in contact with the person doing the cleaning.





F. H. Kilberry, President, and Charles Copeland, oldest employee of Atlas Imperial Diesel Engine Company, unfurl the Army-Navy "E" Burgee.



F. H. Kilberry accepting the Army-Navy "E" award on behalf of Atlas Imperial employees, at the Oakland, California plant, early in March.

ARMY-NAVY "E" TO ATLAS IMPERIAL DIESEL ENGINE COMPANY

ON January 30th, Robert P. Patterson, Under Secretary of War, notified the "Men and Women" of Atlas Imperial Diesel Engine Company, Oakland, California, that the Army and Navy were conferring on them the Army-Navy Production Award for high achievement in the production of materials of War. Under Secretary Patterson further wrote, in part: "You men and women—are making a heartening contribution to Victory and have reason to be proud of the record you are setting." Climaxing this coveted award, were ceremonies held in the Atlas-Imperial Oakland plant, March 5th, when the Honorable Dr. John F. Slavich, Mayor of Oakland, introduced Major General Frederick Gilbreath, U.S.A. who formally presented the Army-Navy "E" pennant and in his

remarks, traced the history of Atlas Imperial from 1903 also revealing that the first Atlas Diesel engine, built in 1914, once rebuilt, did twenty years ferry boat service in Puget Sound and is still in service in Los Angeles Harbor. Major General Gilbreath closed his remarks with congratulations to Atlas Imperial employees on being the first in their area to receive the Award sponsored by the Transportation Corps. F. H. Kilberry, President, in acknowledging the award said to his employees, in part: "Let us be sure that that same approval is extended without hesitation when our record is reviewed at the end of six months. . . . Knowing your spirit and accomplishments of the past, I am confident that our past record of achievement will be further improved."



Major General Frederick Gilbreath, commanding officer of the San Francisco Port of Embarkation, conferring the Army-Navy "E" award for high achievement in war production.

. . . . Continued from page 50
valve or a spring occasionally break on some stage of the compressor, thus affecting the functions of the compressor and a consequent drop in pressures. This breakage of the valve or spring may be due to any number of causes, such as wear and tear. Or foreign substances such as pieces of broken springs, etc., lodging on the valve seat may cause the valve to crack. The pressures cannot be brought back to normal without replacement of the broken part.

Hence the operating engineer, knowing that such an incident is likely to happen, has a complete valve assembly ready and while he must have a short period of outage to make the change, the replacement can be made with a minimum amount of delay.

These two instances are examples of what we might term "conventional failure" of equipment. They have happened in the past and will continue to happen in the future and most

engineers have experienced such incidents at some time or other. Such parts of the equipment as rings, compressor valves, fuel check valves, etc., are subjected to more wear and tear and strain in unit operation, than many of the other integral parts, and regardless of care, maintenance and the material involved, they will occasionally fail under load, thus presenting the problem of quick repair in order to again secure normal service. Because such failures happen, it does not necessarily follow that they are the order of the day.

Unconventional failures are accidents to certain parts of the equipment which are rarely anticipated in a unit in good mechanical condition. They are unanticipated due to the fact, that theoretically there should be no cause for such a failure. This can best be illustrated by the sketch shown in Figure 1. This sketch shows a high pressure compressor piston assembly which is fastened to the piston rod "A" by means of a special cap screw "B." Since the travel of this piston assembly is straight up and down, the cap screw tightly drawn down and locked in place by the pin "C," the rings in good condition and the piston liner in good shape, there also being proper clearance between the cylinder head and the piston assembly at top stroke, theoretically this bolt should not have broken. But it did, at the point indicated. This I would term an "Unconventional failure," something not often experienced nor looked for. The only cause for such a break that could be discovered was the construction of the bolt. In order to eliminate repetition of the failure, the new bolt as now constructed was made like that shown in Figure 2. This design did not weaken the bolt since the stock at the point marked X was of the same diameter as the small part of the thread, and no bolt is stronger than the smallest part of the thread diameter.

From these illustrations we might say that it is the "unconventional failures" which cause the greatest amount of outage and present the more difficult problems of repair.

Ralph Miller Appointed Chief Engineer by Worthington

RALPH MILLER has been appointed Chief Engineer of the Engine Research and Design Division of the Worthington Pump & Machinery Corporation.

Mr. Miller went to Worthington from the American Locomotive Company, Diesel Engine Division, having formerly been with National Supply Co., Superior Engine Division as consulting engineer and with Ingersoll-Rand Company as Chief Engineer of the Diesel Dept.



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Most certainly it will—and sooner than you may expect! With it will come the crucial test of whether or not American industry can convert as efficiently to peace as it has to war. From our extensive relations with hundreds of varied manufacturers we know of scores of amazing new products that only await the message of peace to come into being. Everyone looking ahead to that great day can even now count on the assistance of the Weatherhead plants which are producing scores of vital parts for planes, tanks, ships, trucks and munitions at the rate of *millions every day!*

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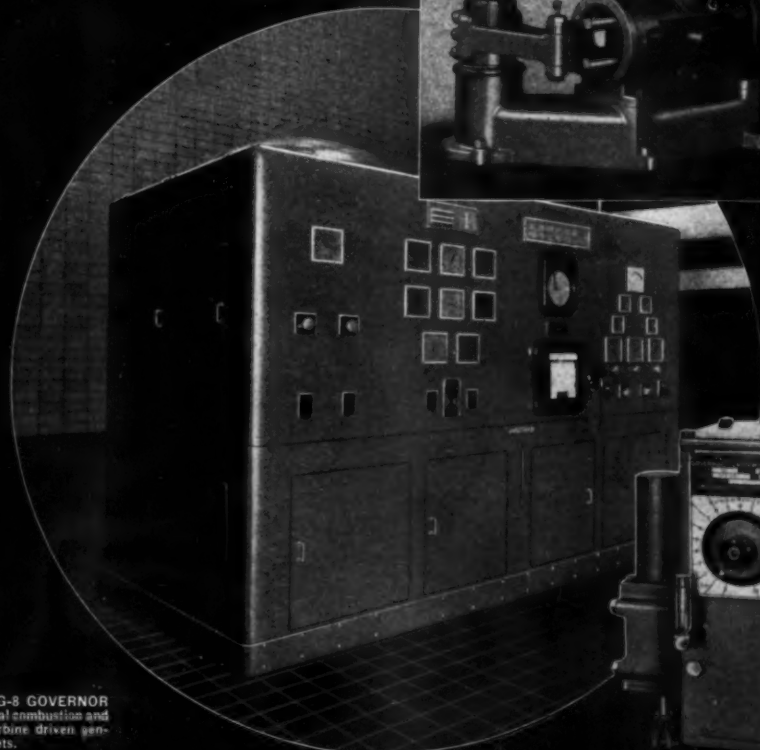
AIRPLANE GOVERNOR
for controlling the pitch of
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TYPE SC-X GOVERNOR
for small internal combus-
tion engines.



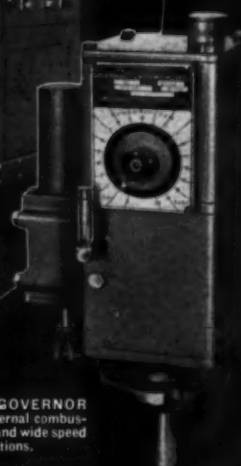
TYPE UC-8 GOVERNOR
for internal combustion and
steam turbine driven gen-
erating sets.



CABINET TYPE ACTUATOR
for large hydraulic turbines.



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for small and medium size
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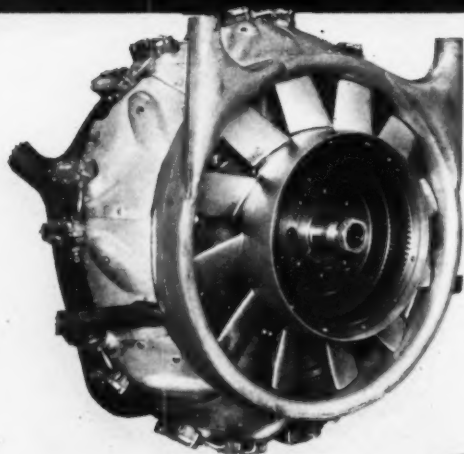
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Third Successive Navy "E" To Consolidated Shipbuilding

THE employees of the Consolidated Shipbuilding Corporation have been awarded their third successive Navy "E." This is the first triple award to be made for outstanding shipbuilding achievement in the Third Naval District, a distinction not easily earned.

Following is a quotation in part from a letter written by Admiral J. M. Irish, USN, Supervisor of Shipbuilding in New York:

"The record established by the recipients of the award indicated a clearly outstanding achievement in the production of war materials. Excellence was shown in the quantity and quality of production in the light of available facilities. In addition, the employees and management have shown more than usual proficiency and competence in overcoming production obstacles, avoidance of stoppages, cooperation to effect fair labor conditions, training programs, effective management, favorable health and sanitation standards, low accident rate, adequate plant protection, the utilization of subcontracting facilities and the conservation of critical materials."



Officiating were (left to right): Admiral J. M. Irish, USN, Supervisor of Shipbuilding, New York, who presented the "E" pennant; Mrs. David Challinor, Chairman Women's General Committee, New York Chapter, 1943 Red Cross War Fund, sponsor of the PC 1237, and William G. Wood, President of Consolidated.

The ceremony was held on Saturday, April 3rd at the Consolidated Yards, Morris Heights, New York City. In conjunction with the raising of the new "E" pennant with two stars, a combat ship, the USS PC 1237, was launched. That portion of the program was broadcast over WABC. Mrs. David Challinor, Chairman, Women's General Committee, New York Chapter, 1943 Red Cross War Fund, was sponsor of the new vessel. The ceremony was dedicated as a joint company and employee effort to help swell the 1943 Red Cross War Fund. The program was opened by master-of-ceremonies, William J. Dunn, CBS war correspondent on leave from the southwest Pacific. Mr. Dunn gave a vivid word picture of his experiences with small boats, how he escaped from Java just ahead of the Japanese occupation and finally reached Australia after ten days at sea during which they were attacked by Japanese aircraft. Mr. Dunn conveyed to the employees of Consolidated the high regard in which the British and Australian Naval officers hold American-built ships.

Mr. Will dated, th early part the emplo ing the d and how our Navy Midway a of Guadal as awards be won, tinue to w nor, Mr. V Red Cross battlefrom

Following West of th Mr. Wood the PC 1237 prow and join our fi

Mr. Dunn Hugh who sea duty a Having spe yards the his ship, L many of t praise of C ly received made the speech he



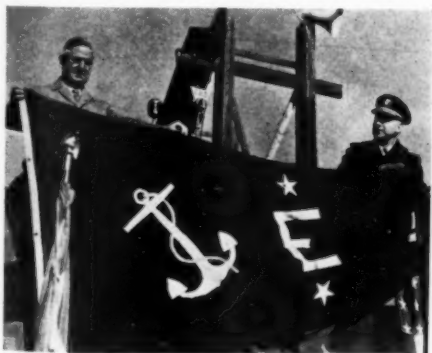
(Left to right) Consolidated with two stars visor of Sh

ployees for other comp Admiral Iri combatted themselves stay out ne home could Mr. Wood two stars fro presentation

Mr. William G. Wood, President of Consolidated, then spoke, recounting the company's early participation in the war effort, telling how the employees won their first "E" pennant during the dark days ten weeks after Pearl Harbor and how the second "E" was earned at the time our Navy was winning the gallant victories of Midway and the Coral Sea and the occupation of Guadalcanal. Mr. Wood pledged that as long as awards for efficient war production were to be won, the men of Consolidated would continue to win them. In introducing Mrs. Challinor, Mr. Wood praised the humane work of the Red Cross in its services throughout the world battlefronts and even behind enemy lines.

Following an Invocation by the Rev. Canon West of the Cathedral of St. John the Divine, Mr. Wood gave the signal for the launching of the PC 1237. The bottle smashed against its prow and another vessel slid down the ways to join our fighting Navy.

Mr. Dunn next introduced Lieut. Phil L. MacHugh who had just returned from eight months' sea duty aboard a Consolidated-built PC boat. Having spent several weeks at the Consolidated yards the year before, during the outfitting of his ship, Lieut. MacHugh was known to a great many of the employees, and his remarks in praise of Consolidated boats were enthusiastically received. Admiral J. M. Irish, USN, then made the "E" Award presentation. In his speech he complimented Consolidated em-



(Left to right) William G. Wood, President of Consolidated, receives the new "E" pennant with two stars from Admiral J. M. Irish, Supervisor of Shipbuilding, New York.

ployees for their attention to duty. Only one other company has a lower absentee record. Admiral Irish told how absenteeism can be combatted by public opinion, by employees themselves getting after fellow-workmen who stay out needlessly, how the women-folks at home could discourage taking time off the job. Mr. Wood received the new E pennant with two stars from Admiral Irish. Then came the presentation of certificates of appreciation to

William J. Bolen and Samuel J. Pouria, both among the oldest of Consolidated employees. The certificates will be presented to each employee, recognizing the individual's contribution to winning the third "E" award and complimenting him for his work. A V-pin, symbolizing the award and bearing a miniature Navy "E" pennant with two stars, accompanies the certificate.

Power Plant Operators Requested To Send Operating Cost Data

THE Oil Engine Power Committee of the ASME is actively engaged in gathering and com-

piling power plant operating cost data. Through its chairman, J. H. Gallaway of Nordberg Mfg. Company, the Committee has urgently requested the cooperation of all power plant operators in sending in their operating cost figures. The more plants heard from the more comprehensive the Committee's report will be. Whether or not you have received a request for your figures direct from ASME, the Committee wants to hear from you. Send your plant operating cost data to Mr. H. C. Lenfest, Secretary, Oil Engine Power Committee, ASME, c/o Am. Locomotive Co., 30 Church St., New York.

GLOBE SPINNING POWER IS STARTING POWER FOR THIS BUDA-LANOVA DIESEL



You are hearing a lot about Globe Batteries for all uses of modern Diesels. Globe Spinning Power performance in war-time replacement service — the toughest job a battery ever had — has demonstrated its high efficiency for Diesel starting.

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DP-343

IMPROVING DIESEL FUEL OILS

WITH the rapid strides that are being made today in the development and application of the high speed, solid-injection compression ignition engine, we find greater consideration and study being given to the types of available fuels and their operating characteristics. This has been due to two reasons; 1st, to the fact that this important phase of Diesel operation has lagged far behind its advancement in design and application; 2nd, to the tremendous expansion of this division of the Diesel Industry.

Although a great deal of experience had previously been accumulated on the use of more viscous fuels in the slower speed stationary Diesel engines, definite information had been lacking as to the proper type of fuels required for the successful operation of high speed Diesels until the past few years. In this latter period a great deal of work has been accomplished by the various trade and engineering societies along these lines. It has been the sole purpose of these organizations to establish definite Diesel fuel standards that would not only include the ideas of the engine manufacturer but those of the oil refiners as well. An economical and satisfactory balance had to be drawn between what was considered the ideal fuel and that which could be easily produced by most of our present day refineries.

There is no question that the establishment of suitable standards has been a rather difficult and tedious undertaking. For in the past, a great many Diesel manufacturers published sets of "specs" so exacting that if they were to be followed in every detail even the refinery would

* Mgr. of Lubrication Service, E. F. Houghton & Co., Philadelphia, Pa.

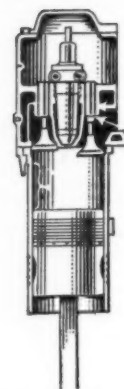
have had a rather difficult time in producing a fuel of this nature continuously. On the other hand, where the engine manufacturers published loosely drawn "specs" so as not to offend the refiners and to include all of them, we find that these privileges were apt to be misused when it became necessary to dispose of residual fuel oil stocks.

However, it has been our privilege for the past ten years as an interested bystander to follow the development of suitable fuels both for gasoline as well as Diesel engines. As a result, it is our belief that we are now passing through a period in which the research departments of all the leading oil companies are working constantly to improve the characteristics of their available fuels to such a degree that they will be more easily adapted to the functions of Diesel engines. We are also passing through a period in the development of Diesel fuels similar to that experienced in the development of our present day high octane gasoline. The work which is now consuming the greatest amount of time is centered around one of the most important requirements of a successful fuel—ignition quality.

A study of the patent literature reveals the fact that a great many organic chemicals have been patented which when added directly to fuel oil tend not only to improve its cetane rating but its ignition quality as well. Chemicals patented during the last few years include the various general classes of organic nitrates, peroxides, phosphates, sulphur compounds, and many others. There is every indication that our Diesel fuels of the future will be very highly compounded or "doped" to improve not only their ignition qualities and cetane rating, but also their lubricity, gum solvency, and corrosion-resisting properties as well.

Our own experiences, both in the laboratory and in the field for the past 12 years, have been concerned with the development of the following important properties: 1. Lubricity at high and low temperatures; 2. Gum solvent characteristics.

Through these years of painstaking research, combinations of halogenated aromatic compounds together with other ingredients have been developed and patented which, when added directly to fuel oils in the proper proportions, would greatly enhance the above properties. A short discussion of each of the above fuel oil properties will depict the work which has been accomplished along these lines with these new chemical addition agents.



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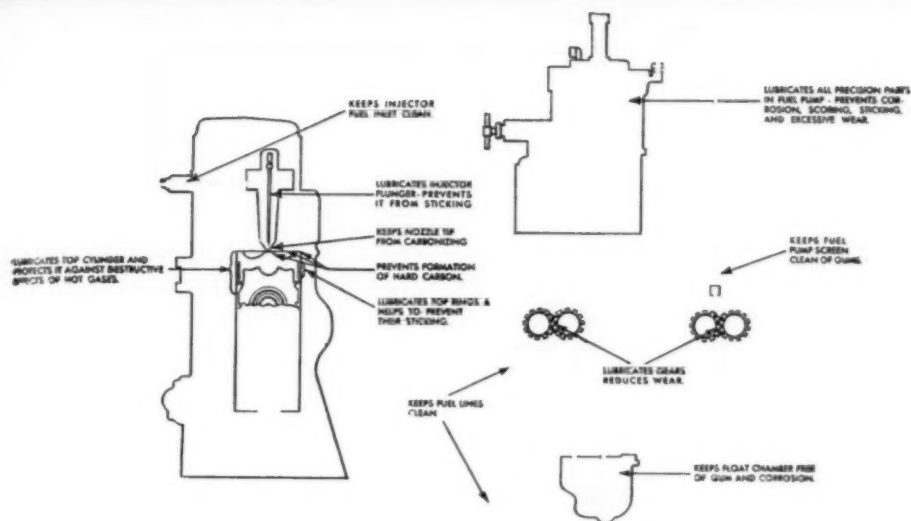
Effects of Diesel fuel additive on upper cylinder regions.

The next important physical property required of a suitable Diesel fuel, aside from the proper cetane rating, is its lubricity, or its ability to lubricate all moving surfaces under all ranges of temperatures. It has been our experience that, due to the nature of the chemical refining processes necessary to produce fuels of lower boiling ranges and with the proper ignition qualities, the lubrication values of fuels have been greatly affected. The true value of this important characteristic of Diesel fuels is reflected in its ability to control the rate of wear of the moving surfaces and the amount of fuel leakage at the nozzles, plungers, and valves.

The theory behind the application of the halogenated aromatic compounds in Diesel fuels is that they possess definite polar properties, which cause the formation of an adsorbed film on the surfaces of the moving parts that come in contact with the treated fuel. This adsorbed or molecular film possesses a very high degree of lubricity and extreme pressure characteristics. Its load carrying ability is three to four times greater than that of straight-run untreated fuel oil. The presence of this film contributes welcome relief to the life of the finely finished and tightly-fitted precision parts in the fuel pump and injector. It is the purpose of this compound to afford definite protection and lubrication to the working surfaces of the fuel injection system under all ranges of temperatures.

When injected into the combustion chamber with the Diesel fuel, the same thin, adsorbed film is formed on all parts of the upper cylinder. This film lubricates the cylinder wall on the area of ring travel. Furthermore, as one of the more important chemicals in this product has a boiling point well in excess of 750°F., the film affords the cylinder walls both high temperature protection and high temperature lubrication without decomposition, thereby protecting these surfaces from wear.

The use of treated fuels also insures more perfect valve seating and freer valve action through positive high temperature lubrication. This was quite evident from the results of our work with



Effects of Diesel fuel additive on fuel system.

one of the country's largest valve manufacturers. This manufacturer reported after extensive tests that, using this material, valve action was noticeably improved, valve temperatures were reduced by 75-100°F., and valve life materially increased. Its use as an external valve oil which is hand applied has already received national prominence both in the stationary and marine fields.

The true importance and function of gum solvent characteristics in fuel has yet to be fully apprehended by both the designer of Diesel engines and the refiners of our present day fuels. With the variance in an engine's operating characteristics in going from high speed to low speed, high power to low power, and the like, we find conditions quite conducive to the formation of relatively high carbon and gum deposits. The overlapping of cycles would also tend to indicate the possibility of this same condition due to the effect of incomplete scavenging of cylinders. The non-uniformity of fuels and the lack of standardization of crudes suitable for the manufacture of Diesel fuels constitute another important factor worthy of consideration and study in dealing with this problem of gum and carbon deposits. The instability of fuels while in storage also affects the operation of Diesel engines due to the precipitation of gums and other deleterious organic products.

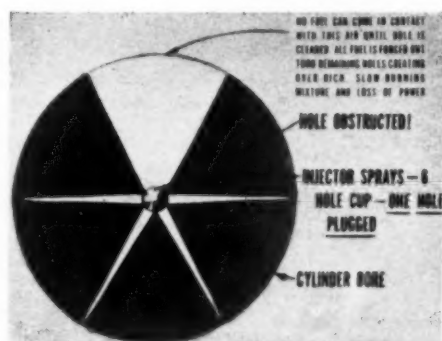
The effect of such deposits on performance is reflected in many ways—decreased horsepower output, valve and ring sticking, loss of compression, blow-by, rough running engine, etc.

It has been our experience that the use of this combination of halogenated aromatic compounds has a definite tendency to dissolve carbon gum binders and control any further formations. This is quite evident from results ob-

tained in freeing stuck valves and improving valve action when units are run continuously on treated fuel. The use of these materials does not in any way, however, imply that badly carboned valves and valve stems will be improved, for, on the contrary, there would be a definite tendency to increase this problem rather than decrease it. The results of its use in badly worn units, that should be overhauled, would be to increase valve clearances and promote an increase in oil consumption by the removal of carbon deposits which have replaced worn metal.

However, it has been definitely proven that carbon deposits in combustion chambers can be reduced through the solvent action of these special organic chemicals. The use of these materials in Diesel fuels is also highly beneficial to the operation and life of piston rings. By reducing and controlling the carbon formations behind rings, rings do not become set or lose their flexibility. Its use insures greater ring freedom.

The instability of our present day fuels is very easily counteracted by the use of these gum-



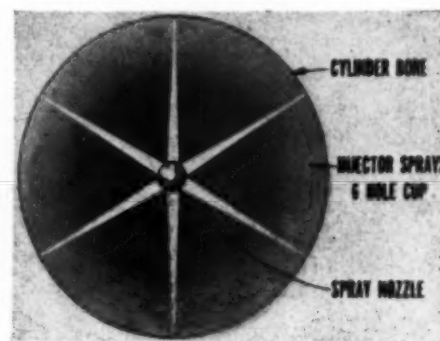
This shows the effect when one spray hole is plugged.

solvents. It has been definitely proven that their use in fuel oils will prevent the precipitation of gums and other unsaturated hydrocarbons both in the fuel tank and on the various parts of the fuel injection system. Its continued use would also improve the action of those units of the fuel injection mechanism whose functions have become impaired through the precipitation of gums.

Thousands and thousands of dollars have already been saved—not to mention the probable number of lost man-hours that would have resulted—through the use of this product in the marine industry, where little effort has been made to control the quality and type of fuel being used. Its use has also proven invaluable on such installations that have required the use of preheaters and utilize a No. 6 or Bunker C type of fuel oil. Fuel injection equipment as well as the other precision type of working mechanism is definitely protected against the deleterious effects of this inexpensive fuel. Ring and valve life are greatly extended.

In this discussion we have attempted to bring to light the great amount of work which is going on behind the scenes today by all disinterested parties in the development and improvement of present types of fuels for Diesel engine applications. Where a great many other firms are placing a good deal of stress and emphasis upon the ignition qualities, our efforts have been devoted solely to those problems dealing with lubricity or wear, and gum solvency.

We believe that with the acute situation which exists in the unstable Diesel fuel market today, the necessity for the proper type of fuel treatment as has been described is pressing and paramount.



The cup is so designed that the charge of fuel is injected in a fan shaped spray.

Photos, courtesy of Cummins Engine Company

New injector cup tip.

Fine abrasives in fuel cause this type of failure.

This is the effect of high acid or sulphur content in fuel.

Fighting Generators for Fighting Fronts



FOR AIR BASES



FOR
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ELECTRIC GENERATORS THAT MEET REQUIREMENTS OF U. S. ARMED FORCES FOR MOBILE EQUIPMENTS

STURDY without being heavy and hard-to-handle—easily assembled, with either a gasoline or a diesel engine—engineered to prevent radio interference. These G-E generators will help you, as a manufacturer of engine-driven sets, to meet the exacting standards for fighting equipments set by the U. S. Armed Forces.

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It grips like a giant's fist—yet it can be slipped or “inched” at will. Starts smoother, runs cooler, under uniform pressure.

It is positive in operation, yet so flexible as to absorb terrific shocks and vibration, and corrects misalignment automatically.

It is long wearing—needs no bearings, levers or toggles—requires no adjustments—no lubrication. Its control is a single pneumatic valve.

It is the FAWICK AIRFLEX CLUTCH—new, but already *proved* in hundreds of installations for Navy, Merchant Marine and industrial Diesel drives, heavy duty presses, cranes and dredges, oil field drilling rigs and many other severe-service applications.

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FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR



Pyrometers as employed for indication of Diesel exhaust temperatures must be accurate and remain so throughout the life of the engine. It is comparatively simple to build such a pyrometer for remote mounting—but it is quite another problem to design and construct a pyrometer that will assure the protection expected of it when mounted directly on the engine—as shown above.

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Diesel Engineers To Discuss Wartime Problems At Baltimore Meeting

WITH Diesel engines serving the armed forces on all fighting fronts, the tentative program planned for the 16th National Oil & Gas Power Conference to be held June 14-16 at the Lord Baltimore Hotel, Baltimore, Md., will emphasize, in technical sessions and inspection trips, the naval applications of Diesel engines.

Maintenance of Diesel engines in naval service will be the theme of one technical session while another will deal with new developments of chrome-plating for cylinder liners and piston rings that promise to increase service life. Highlight of another session will be a discussion on the present position and future prospects of Diesel fuels—a subject of extreme timeliness and importance. Other papers will cover the application of the new internal-combustion-engine test code, investigation of large Diesel-engine wristpins, methods of calculating stresses in connecting rods, and the newly developed supersonic reflectoscope for inspecting materials.

If wartime restrictions permit, inspection trips will be made to the Naval Experiment Station at Annapolis, with its world-famous Diesel-engine laboratories, and to the American Hammered Piston Ring plant, making rings for everything from aircraft engines to the 70-in. dia. low-pressure pistons of Liberty ships.

Admiral Mills, in charge of the engine division of the Bureau of Ships has been invited to speak at the banquet, on the general subject of rating Diesel engines for naval service.

At the exhibit, an annual feature, leading manufacturers have arranged to display the latest in engines and accessory equipment.

Of course all members realize that Baltimore is one of the busiest industrial cities in the United States and therefore the hotels are crowded at all times. The Management of Baltimore hotels have requested that members double up as much as possible to consume space and it is also emphasized that all reservations should be made in advance and that people should not rely on gambling on the possibility of obtaining rooms on arrival.

Westinghouse Science Short

PLANTS of the Westinghouse Electric and Manufacturing Company use more radium than the largest hospitals. With radiations from radium salts, engineers take "pictures" through metal castings over a foot thick, to detect flaws.

**154 ENGINES
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Caterpillar Industrial Engines
Caterpillar Marine Engines
Chicago Pneumatic Model 8-CP. and 9-CP
Chicago Pneumatic Type 16-CP
Chicago Pneumatic Type RHB-50
Clark Bros. Diesels
Cooper-Bessemer Type 1S
Cooper-Bessemer Type EN & GN
Cooper-Bessemer Type LS Marine
Cummins Diesels
De La Vergne Type VA
De La Vergne Model VB
De La Vergne Model VG
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Guiberson Radial Diesels
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Lorimer Diesels
Mack-Lanova Diesels
Menasco Diesels
Murphy Diesels
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Nordberg 2-cycle Diesels
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Palmer Bros. Diesels
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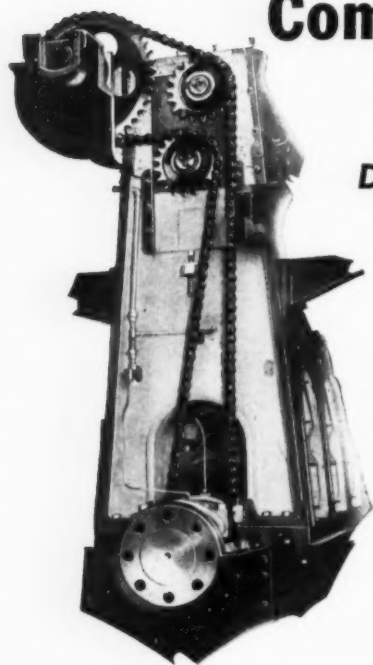
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Your name imprinted on front cover for 50c additional, if you so order.

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Diamond Roller Chain Timing Drive on Rathbun-Jones 2250 h.p. oil engine. Chain is Diamond No. 480.

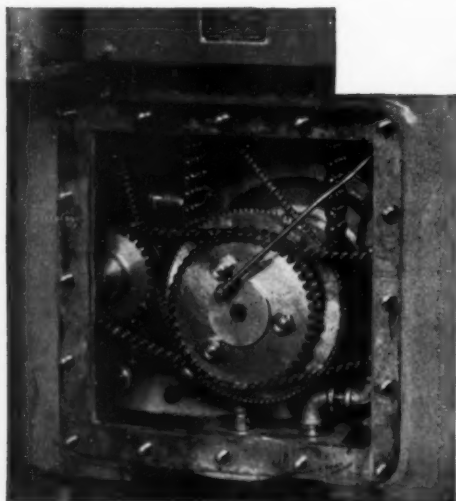
Diamond Roller Chain Drives Used by Leading Engine Builders

● For the British and U. S. N. PT type fighters,—for the dependable U. S. Coast Guard Patrols,—for the Flat Tops,—for Landing boats,—Army speed boats, and the many types of combat and cargo vessels, leading engine builders have selected precision-made Diamond Roller Chains for their Timing Drives.

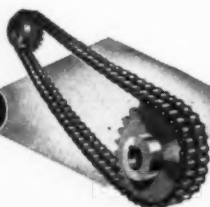
These Diamond-timed engines include the Hall-Scott Invaders and Defenders;—the Sterling Vikings, Hercules gasoline engines;—the marine steam engines made by Skinner, Ajax and Nordberg; the diesels of Gray (GMC), Fairbanks-Morse, Baldwin De LaVergne, Ingersoll-Rand, Cooper-Bessemer, Buckeye, Kahlenberg, Atlas Imperial, Palmer, Nordberg, Hercules, Kermath, National Transit, Superior, Buda, Hall-Scott, Regal.

Such universal usage of Diamond Roller Chains,—such wide adoption by engineers of highest world rank—speak volumes for the accuracy, uniformity and fitness of these chains for a duty requiring complete dependability. . . . DIAMOND CHAIN & MFG. CO., 407 Kentucky Avenue, Indianapolis, Ind. Offices and Distributors in All Principal Cities.

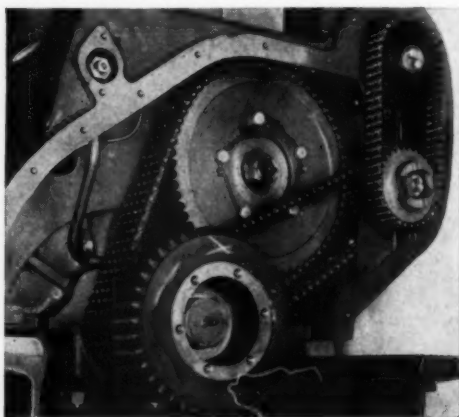
End plate removed to show Diamond Roller Chain Timing and Auxiliary Drives on 2000 h.p., 325 r.p.m. Skinner Marine Unaflo Steam Engine for dredge-pump drive.



DIAMOND ROLLER CHAINS



Timing, Water Pump and Accessory Drives of Diamond Roller Chains on Sterling Viking 600 h.p., 1200 r.p.m. engines supplied U. S. Coast Guard.



Army-Navy "E" Awarded to Penn Electric Switch Co.

ON March 5, 1943, Army and Navy officials went to Goshen, Indiana to present the Army-Navy "E" award for proficiency in war production to Penn Electric Switch Co.

During impressive ceremonies, held in the local high school auditorium, approximately 700 employees heard themselves praised by Army and Navy officials as hard fighting soldiers on the home front.



Cmdr. James S. Laidlaw, U.S.N., Bureau of Ordnance, Washington, D. C., in presenting the coveted Army-Navy "E" revealed to the Penn employees that they, through their production efforts were responsible for five enemy planes which attacked a convoy bound for Russia. Comdr. Laidlaw read the log of one of the vessels which listed five enemy planes downed with Navy guns equipped with firing apparatus manufactured by Penn Electric Switch Co. Mr. Albert Penn, President, in accepting the Army-Navy "E" pennant from Comdr. Laidlaw gave assurance that the production record would not only be maintained but every effort will be made to increase it.

Major Joseph G. Wood, Officer Procurement Division, Indianapolis, Indiana presented "E" pins to four selected employee representatives. In awarding the "E" pins, Major Wood said, "This award is a form of recognition which you have won on merit and which you richly deserve . . . fellow soldiers, I salute you." The employees receiving the pins from Major Wood were Joe DeBiaggio, Merle Raper, Merle Rogers, and Mrs. Pearl Swart.

Congressman Robert A. Grant, member of the House of Representatives Naval Affairs Committee, was one of the distinguished speakers during the ceremonies. In his stirring address on absenteeism in war industries, Congressman Grant said, "Any American at home whether he is employer or employee, who remains away from his job, fails as a citizen."

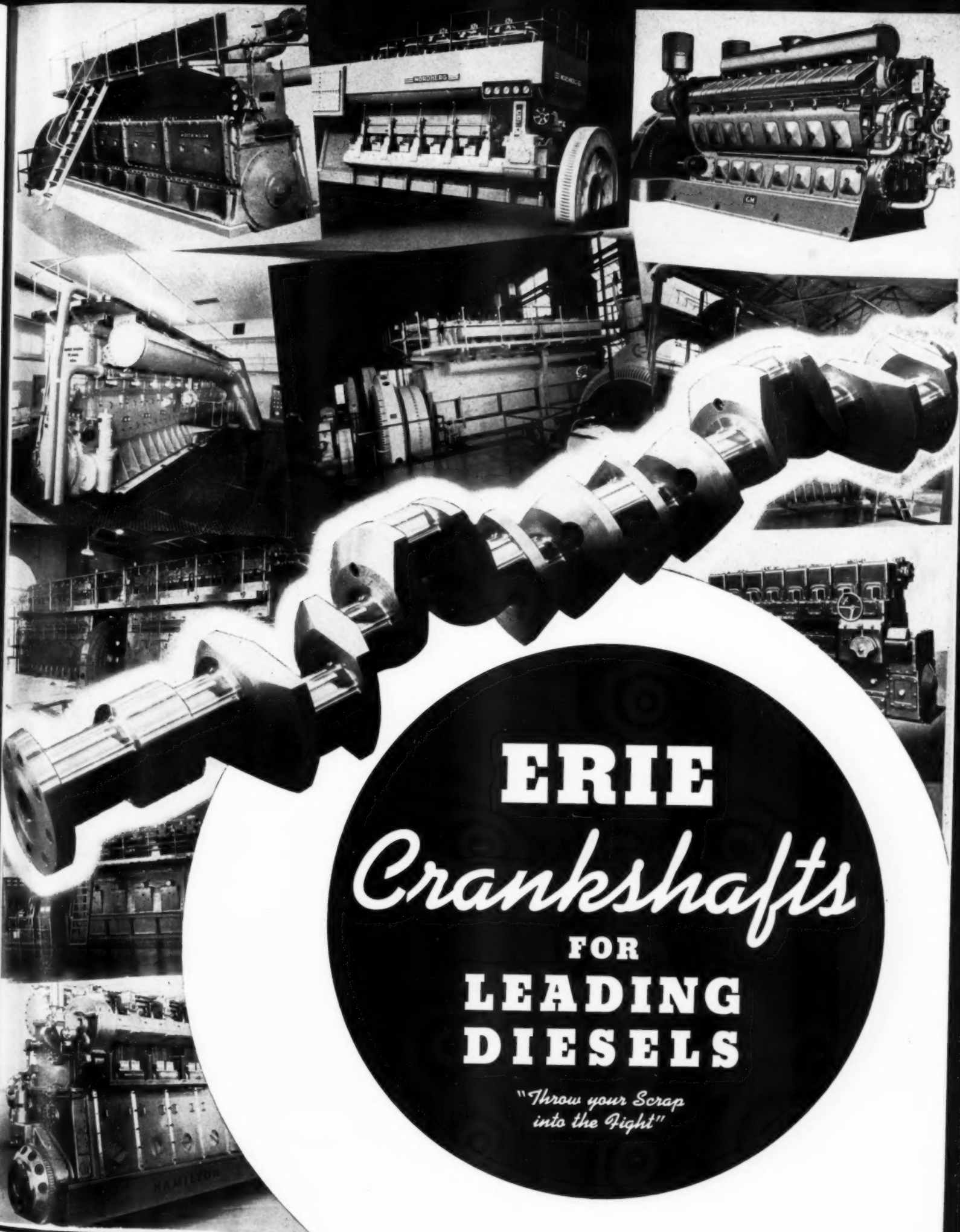
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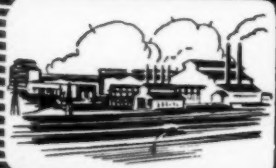


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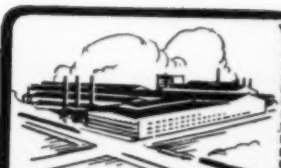
Crankshafts

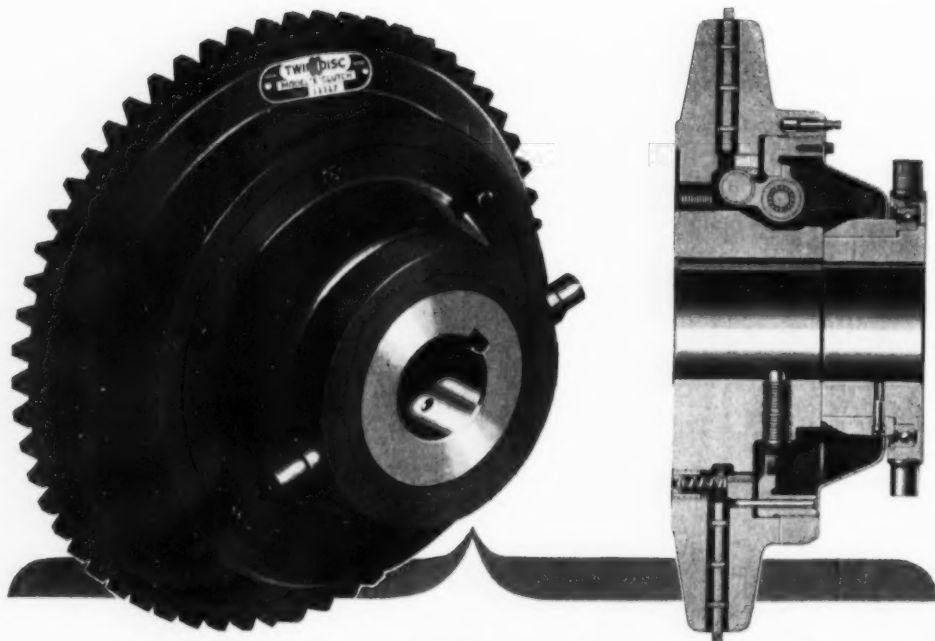
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*"Throw your Scrap
into the Fight"*



ERIE FORGE COMPANY, ERIE, PA.





Fully Enclosed **.. a double value**

To the manufacturer or the operator of a drilling rig, the "fully enclosed" feature of a Twin Disc Model E Clutch has two distinct advantages:

First: The clutch is shielded from sand, dirt, gravel or small stones which might fall into the clutch and hamper its operation or seriously curtail its in-built life.

Second: Even though fully enclosed the Model E is adjusted by hand from an outside easily available point—nothing to take apart—no special tools needed.

This "fully enclosed" feature is only one of a number of significant design characteristics which show how fully Twin Disc Clutches meet the needs of the driller . . . and further how intimately Twin Disc engineers have worked with the designers and builders of modern drilling equipment. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin.



Vice President of Rogers Diesel and Aircraft Corporation Joins Air Corps

NEIL S. WATERMAN, Vice President, and General Manager of the Edwards Company, Sanford, N. C. division of the Rogers Diesel and Aircraft Corporation has been commissioned a First Lieutenant in the Transport Service of the Army Air Corps. Mr. Waterman, who has been with the corporation since its inception, is an experienced pilot and has flown his own plane for some time. After a period in Officers' Training School he will be assigned to a post in West Palm Beach for temporary duty.



Neil S. Waterman

SKF Announces Executive Promotions

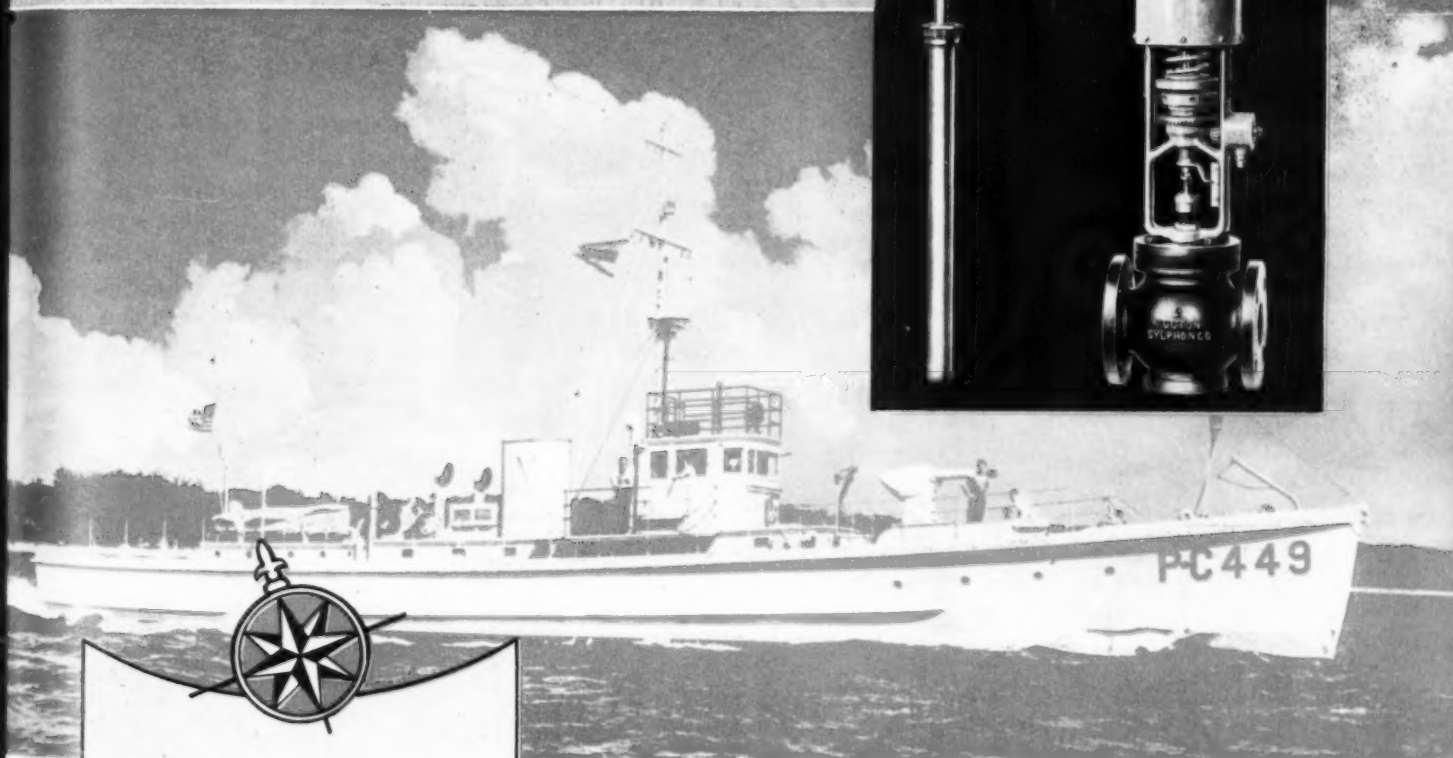
THREE executive promotions were announced by S. F. Wollmar, executive vice-president of SKF Industries, Inc., Philadelphia manufacturers of ball and roller bearings, following a recent meeting of the Board of Directors.

Thomas W. Dinlocker was elected vice-president and treasurer, Richard H. DeMott, vice-president in charge of sales, and C. P. Collins, secretary. William L. Batt, vice-chairman of the War Production Board, retains the presidency.

Credit Turner Richards

THE splendid photographs illustrating the article titled, "Wood and Diesel Go To War As the YMS-241 Joins The '400,'" which appeared in the April issue of DIESEL PROGRESS, were taken especially for DIESEL PROGRESS by Turner Richards, official U. S. Navy photographer at Tacoma, through the courtesy of the 13th Naval District.

SYLPHON MARINE CONTROLS



OFFICIAL U. S. NAVY PHOTOGRAPH

SYLPHON CONTROLS FOR MARINE SERVICE

include:

- Heating and Ventilating Controls
- Fresh Water Heater Controls
- Fuel Oil Heater Controls
- Diesel Engine Cooling Controls
- Diesel Engine Safety Controls
- De-superheater Controls
- Steam Jet Ejector Condenser Controls
- Brine Refrigeration
- Packless Valves for Hazardous Liquids



Diesel Jacket Water and Lubricating Oil Temperature Controls

Where heat-exchangers, utilizing sea water as the coolant, are employed to cool Diesel Engine jacket water and lubricating oil—Sylphon Controls are providing dependable, trouble-free service; are helping to maintain engine temperatures at the correct levels for maximum operating efficiency.

The Sylphon No. 923-3 Regulator equipped with three-way valve acting to pass or by-pass the coolant according to temperature demand—has been found ideally suited to the requirements of this service. Self-contained, self-operating, rugged, reliable—it is finding its way into more and more of America's fighting ships.

THE FULTON SYLPHON CO.
KNOXVILLE, TENNESSEE

Temperature Controls...Bellows...Bellows Assemblies

Brazilian Naval Officers Take Diesel Course and Add Welding as Part of Their Instruction

WHEN seven officers of the Brazilian Navy finished their seven weeks' course at the Cleveland Diesel Engine School of the U. S. Navy late in March, they visited industrial plants in Cleveland, Ohio, where parts of Diesel engines are made.



The officers, with Lieutenant Russell Haidet, U.S.N. of the Diesel Engine School (fifth from the left) are (left to right) Chief Petty Officer Oswaldo Damasio, Lieutenant Julio DeMoura, Chief Petty Officer John Jaolino, Lieutenant Junior Grade Walter Magalhaes, Chief Petty Officer Arthur DeCavalho, Chief Petty Officer

Joseph Lobato Neves and Lieutenant Paul Pires.

After finishing his course at the Diesel Engine School, Chief Petty Officer Jaolino remained in Cleveland to take a course in arc welding at The Lincoln Electric Company, world's largest producer of arc welding equipment.

Explaining his reason for taking the course, he said that arc welding forms a very important part of the construction work on modern high speed diesels. The welded crankcase is lighter than the old cast type of case and is more resistant to shock. All the lubricating lines, the fuel oil lines and the cooling system are welded.

The Brazilian officers will be stationed at the Brazilian Naval Base at Natal and will instruct officers and men of the Brazilian Navy in the operation of power boats and subchasers. Lieutenant Pires will have charge of repair and maintenance of these boats at Natal.

After leaving Cleveland, the officers planned to take charge of the transportation of a quantity of these boats from Miami, Florida, back to their home ports for duty against the Axis.

"Diesel and Gas Engine Power Plants" A New Volume By Glenn C. Boyer

MCGRAW-HILL Book Company, Inc. has announced publication of Diesel and Gas Engine Power Plants, by Glenn C. Boyer, Associate Engineer, Burns & McDonnell Engineering Company. Written primarily for Designers and Operators of Diesel- and Gas-engine power plants, this 447-page, illustrated volume is prepared in text style and deals with the plant as an entity rather than with discussion of engines. The author, who is widely known in power plant circles, has consolidated his notes and experiences of the past twelve years in power plant design and constructions to bring out a work of noteworthy practicability and usefulness. Price \$4.00 — order from DIESEL PROGRESS.

Westinghouse Science Short

CONTRARY to the old saying, lightning usually strikes more than once in the same place, engineers of the Westinghouse Electric and Manufacturing Company took a photograph in North Carolina of a thunderbolt that consisted of 31 consecutive separate strokes, all occurring within six-tenths of a second.

100 HORSES NAMED MACK

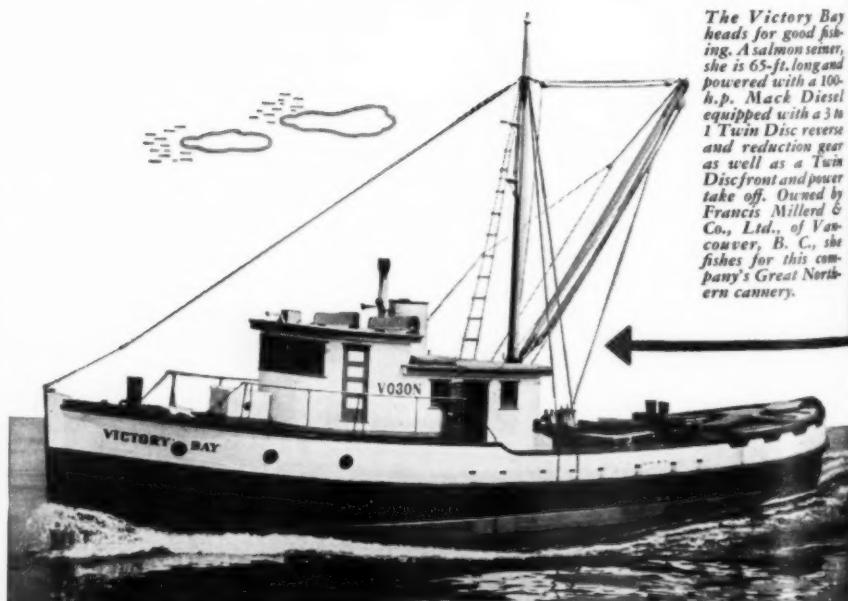
The tough jobs go to Mack Mariner Diesels!

Mack horsepower is rated conservatively on a continuous duty basis. It works for you with 4 cycle efficiency and with economy that causes many owners to write us about savings they find surprising. We are grateful for such letters but not surprised. We build Mack Mariners specifically for marine operation to the highest standards in the world. Compact, full-powered, quick starting they range in size from 65 to 100 h. p.

Direct factory branch service is available at 28 tide-water and 14 fresh-water ports.

Mack Manufacturing Corporation
Marine Engine Division, Long Island City, N.Y.

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF THE WORLD-FAMED GASOLINE AND DIESEL-POWERED TRUCKS, BUSES AND FIRE APPARATUS



The Victory Bay heads for good fishing. A salmon seiner, she is 65-ft. long and powered with a 100-h.p. Mack Diesel equipped with a 3 in 1 Twin Disc reverse and reduction gear as well as a Twin Disc front and power take off. Owned by Francis Miller & Co., Ltd., of Vancouver, B. C., she fishes for this company's Great Northern cannery.

Mack → **DIESEL MARINE POWER**

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PUT NEW POWER INTO THE OLD WAR HORSE

Those "war horses" have been pulling hard now for more than a year . . . for the seventeen months of steady, all-out production since Pearl Harbor.

Already many Diesels are beginning to show signs of strain. Longer hours of operation, less frequent overhauls, fewer replacements—all have increased the hazard of breakdown a hundredfold.

There's one way, even at this late hour, to help keep your Diesel geared for steady, smooth, efficient action . . . *Make sure that you're servicing it with Precision-Perfect Lubricants!*

Cities Service D-C 500 Series Oils for high-speed automotive type Diesels . . . and Pacemaker or Penn-Pacemaker Series oils for stationary type Diesels . . . are designed to meet the most exacting demands of wartime operation.

If you want to be sure you're getting the most out of your Diesels, let a Cities Service engineer study your particular operation. No obligation, of course. Simply get in touch with your nearest Cities Service office today.

For a helpful booklet on "Diesel Engine Lubrication" write to Room 1373, Sixty Wall Tower, New York, N. Y. Free to owners of Diesel engines and their operating personnel.



Maumelle Ordnance Works
Cities Service Defense
Corporation

OIL IS AMMUNITION—USE IT WISELY!



CITIES SERVICE OIL COMPANY
NEW YORK • CHICAGO

IN THE SOUTH

ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.

ARMY-NAVY "E" TO CATERPILLAR TRACTOR COMPANY

Ceremonies attended by 25,000, the largest group ever gathered under one roof in Peoria, Ill.



Holding the "E" Pennant are, left to right: L. B. Neumiller, President, Caterpillar Tractor Co.; Brigadier General David McCoach, representing the Army; Captain E. A. Lofquist, representing the Navy and Merritt Miles, "typical" employee.

★ ★ ★ ★ ★

U. S. NAVY SUBMARINE CHASER

MAINTAINING UNINTERRUPTED VIGIL UNINTERRUPTED POWER

OUR growing fleet of submarine chasers is depended upon to beat down the menace of enemy submarines. Every measure is taken by the United States Navy to keep these peppery little vessels in perfect condition. The direct-reading PREMAX Engine Pressure Indicator is used in Diesel-powered subchasers to check compression and firing pressures—the proper maintenance of which assures maximum engine performance. The PREMAX provides a way to observe these pressures that is unsurpassed in convenience, speed, and accuracy. Requires no skill, scaling of diagrams, or calculations—pressure is read instantly, directly from the scales. The universal application of the PREMAX is proved by its widespread use in vitally important stationary Diesel power plants, by operators of Diesel locomotives, trucks, busses, and road machinery, and on the Diesel engines in scores of combat and auxiliary units of the United States fleet.



BACHARACH
INDUSTRIAL INSTRUMENT CO.
7000 BENNETT STREET, PITTSBURGH, PA.

CATERPILLAR Tractor Co.'s 17,000 employees received the Army-Navy "E" award early in March in a colorful, impressive ceremony witnessed by approximately 25,000 persons.

Brigadier General David McCoach, Assistant Chief of Engineers and Chief, Administration Division, Office of the Chief of Engineers, presented the "E" burgee, to be flown over Peoria's largest industry "because you have kept the faith—because you have done everything demanded of you, and more. It is the visible symbol of what the United States Government, your Government, thinks of your work."

Captain E. A. Lofquist, Chief of Staff, Ninth Naval District, presented token "E" pins to five employees "as symbols of their effort toward victory."

L. B. Neumiller, president of "Caterpillar," accepting the flag from General McCoach, urged that the future be faced with calm courage and unflinching determination.

Merritt Miles, 32-year-old automatic lathe operator, was chosen to respond to the presentation of the "E" pins, on behalf of his fellow employees. He said, "We've got our 'E' and we want to keep it. When our buddies come back from the mud-holes and the deserts overseas and after they've marched victorious through the streets of Berlin and Tokyo, we want them to tell us that we, too, on the production front, have fought a good fight."





NO SEVENTH INNING STRETCH

No easy stretch. No early leavers. No shoulder-shrugging, win-or-lose indifference. None of that! This is do or die War. And it isn't over yet. Not by many long shots, icy voyages, gruelling marches, epic flights, major maneuvers.

This is the time for exertion "beyond the call

of duty". Because we know this at General Machinery Corporation, we keep on producing the machinery, engines, cannon, guns, with which, and because of which our boys will win.

Tense as we are, all of us—Americans—know that there is no seventh inning in this engagement to decide the world championship.

GENERAL MACHINERY CORPORATION

HAMILTON, OHIO

THE NILES TOOL WORKS CO.

THE HOOVEN, OWENS, RENTSCHLER CO.

GENERAL MACHINERY ORDNANCE CORPORATION

Army-Navy "E" To John Reiner & Company

ON the evening of February 20th, in the presence of a distinguished audience, the employees and management of John Reiner & Company were presented with the coveted Army-Navy "E" awarded for high achievement and excellence in war production.

John Reiner & Company of 12-12 37th Avenue, Long Island City, N. Y., has been specializing in the design and manufacture of Diesel Auxiliary Units and Diesel Generating Sets for marine and industrial application. It holds an enviable record of fast delivery and excellence of design and construction with the Army, the Navy, and the Coast Guard, as well as with the principal shipyards throughout the country.

The company was started by Mr. John Reiner in 1927 and progressed steadily along the lines of designing and manufacturing of industrial and marine equipment, particularly complete generating sets for industrial and marine application. The Parts and Service Division of the company carries at all times a complete stock of the various equipment they sell. This division is particularly proud of its prompt serv-

ice. In addition to Mr. Reiner, the partners active in the management of the company are John Merk, Eli Kowal and Charles Goldblatt.



Left to right: Commander Singer, John Nicholas, John Merk, Allen Reiner, John Reiner, Carl Clark, Eli Kowal, Charles Goldblatt, Major Alphin.

The Army-Navy "E" presentation ceremony was held at the Waldorf-Astoria Hotel in New York and was followed by a dinner and dance. Among the distinguished guests who were present at the ceremony were Admiral Farwell, Admiral Hottel, Colonel Gray, Commander A. S. Kibbe and Lieutenant Commander W. Van

Puhl. The Army was represented by Major Alphin who presented the pins to two representative employees, Carl Clark and John Nicholas.

The Navy was represented by Commander Singer who presented the Army-Navy "E" pin to Mr. Reiner. Lieutenant J. Powers was master of ceremonies.

In his speech of acceptance Mr. Reiner said, "Some of us do our work at the drafting board, others at the machine shop, and others at the telephone or an office desk. I want you to know that it makes no difference in this great effort whether we do our work in a white collar or in overalls. What is important above all else is that we put our heart and soul into our work and remember at all times that we are soldiers behind the production line. Our only boss, our Commander-in-Chief and the one whose bidding we are proud to do is our Uncle Sam. He is present tonight on this platform in the persons of the distinguished representatives of the Army and the Navy."

A congratulatory telegram from James Forrestal, Under Secretary of the Navy, was received and read by Mr. Reiner.

BUCKEYE Diesels

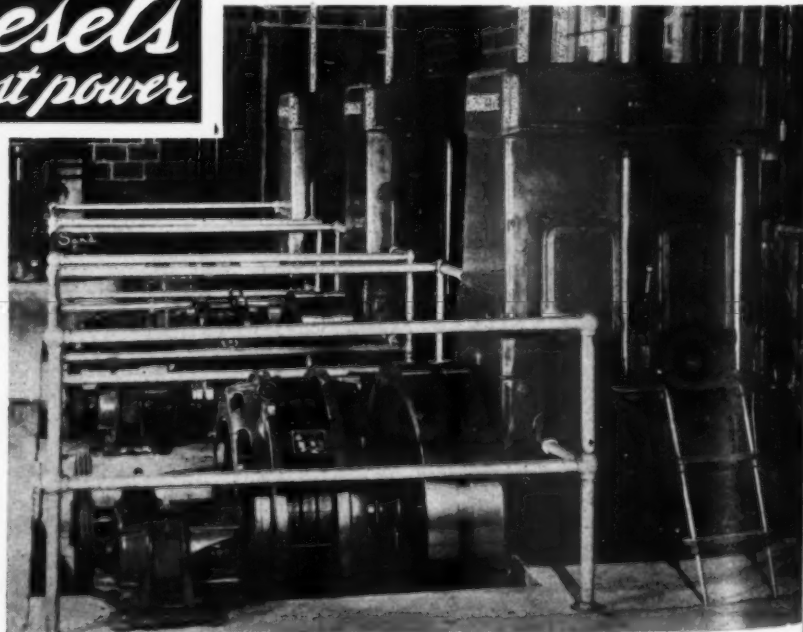
mean reliable, low-cost power

And Reliable, Low-Cost Power means more to modern Industries than ever before. Buckeye Diesel performance, economy, and long life are inevitable results of Buckeye distinctive features -

- * Buckeye Silent Watchman
- * Buckeye Speed Watchman
- * Buckeye Full Pressure Lubrication
- * Buckeye Reversible Shell-type Silver Alloy Bearings
- * Buckeye Complete Engine Enclosure

PLUS

Buckeye Engineering and Craftsmanship Backed by
35 Years' Experience
Engine Builders Since 1908

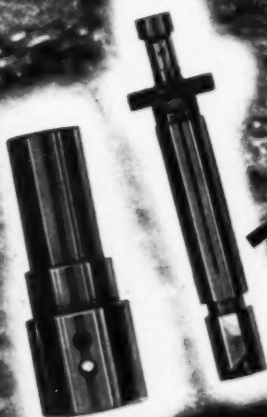
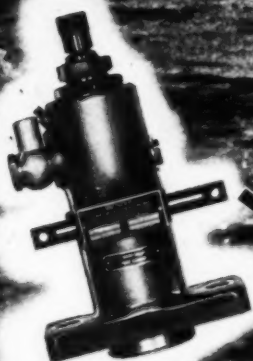


Outstanding performance of these three Buckeye Diesels at Swayze Folding Box Company, Canton, Pa., led to Dieselization of its truck fleet.

Be Profitwise and Dieselize with Buckeyes
THE BUCKEYE MACHINE COMPANY LIMA, OHIO

WHEN DEPENDABLE POWER

Counts Most



OFFSHORE, when heavy seas are running, or in the plant, where production urgency forbids a shutdown "BENDIX-SCINTILLA" Fuel Injection Equipment proves its worth. Sound design, superior materials and precision craftsmanship are combined for long, exacting service in every part that bears the Bendix name.

"BENDIX" FUEL PUMPS—

are port controlled, and flange mounted. Built in a variety of diameters and strokes.

NOZZLE HOLDERS—

are available in shank diameters and shank lengths to suit cylinder heads up to 14" depth. Liquid cooled units are interchangeable with uncooled nozzle holders.

PLUNGER AND BARREL—

afford precise fuel regulation through rotation of the plunger by means of a control sleeve and rack.

THE INVISIBLE CREW

Precision

Equipment by

Bendix
AVIATION CORPORATION

The variety of precisely machined and finished fuel injection parts built by Scintilla are important members of "The Invisible Crew," which includes the equipment, instruments and controls made by 15 Bendix Divisions, serving with our fighting crews on every front.

BENDIX
SCINTILLA

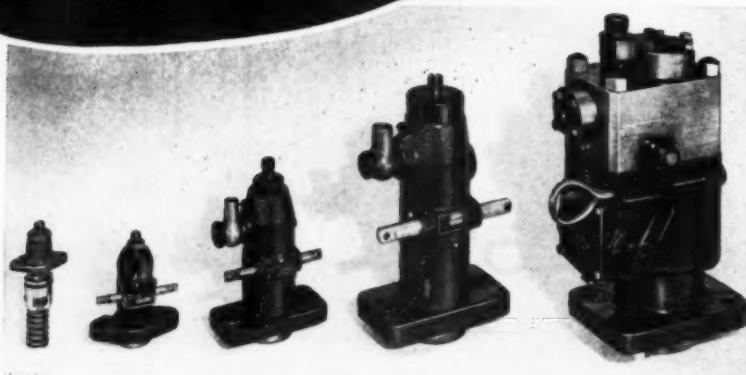
SCINTILLA MAGNETO DIVISION

A

DECO

DEPENDABLE FUEL INJECTION EQUIPMENT

Adeco "know-how" is your assurance of the finest in diesel fuel injection equipment. Today's Adeco pumps, nozzles and nozzle holders reflect the long experience of this pioneering organization in developing precision equipment for the most rigid diesel requirements.

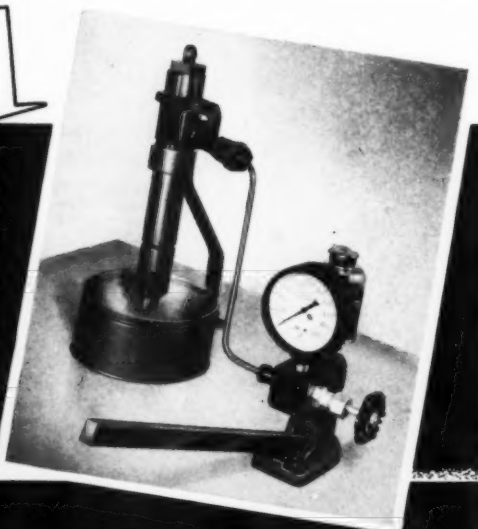


VITAL FOR MAINTENANCE

ADECO NOZZLE TESTER

America's most widely used Nozzle Tester makes it easy for any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, stuck needle valves, and leakage around valve seats. Compact, portable, sturdy, precision-built. Pressures up to 10,000 p.s.i. Tests all makes of injectors. Avoids costly delays and possible damage to injector tips. Best for economical maintenance.

Write for new illustrated bulletin



AIRCRAFT & DIESEL EQUIPMENT CORPORATION
4401 NORTH RAVENSWOOD AVENUE • CHICAGO, ILLINOIS

Robert H. Morse, Jr. Becomes General Sales Manager for Fairbanks-Morse

FAIRBANKS, MORSE & CO. recently announced the appointment of Robert H. Morse, Jr. as General Sales Manager.



Robert H. Morse, Jr.

Mr. Morse, Jr. comes to his new duties with a long and varied experience, beginning in 1916, in the service of the company and its subsidiaries. This experience includes 10 years in the manufacturing divisions, followed by extensive sales experience as Manager successively of the Cincinnati, Dallas, and Boston Branches, and the Stoker Division; and more recently as Assistant Sales Manager.

He enlisted in the regular Army in 1917 and saw considerable experience in France during the first world war. He was married in 1920 and has three children. His oldest son, R. H. Morse, III, is now serving as an Ensign in the United States Navy Reserve.

SKF President Signally Honored

WILLIAM LOREN BATT, vice-chairman of The War Production Board and president of SKF Industries, Inc., Philadelphia manufacturers of ball and roller bearings, has been awarded the Bok Award—a medal and a \$100,000 check—not only for his service to the Nation in leading industrial mobilization of the war, but as a citizen who performed the most distinguished service for Philadelphia in 1942. This award is the twenty-first since its inception by the late Edward W. Bok in 1921.

Since graduating from Purdue University in 1907, Batt has been the recipient of many outstanding honors. Purdue awarded him the de-



Okay, smarty...



In one way, we don't blame you for grabbing the good things and trying to hold on to them.

You swiped a lot of stuff you didn't have and couldn't make, because that's the only way you could get it.

For instance, take all those fine Superior Diesel Engines in the boats, power plants, industries and other property you've stolen.

We know you're guarding these just as religiously as you do your little tin gods.

You know you can't replace Superior Diesel Engines... you can't get any more... and in a thousand years you couldn't make a product that would hold a candle to Superior workmanship and performance.

You haven't got what it takes to compete with the system of initiative and free enterprise that has made American products the standard of excellence all over the world.

We're coming back to square things with you, smarty. And when we really hit, you can just bet there'll be plenty of Superior Diesel-powered warcraft of all kinds to help deliver the shellacking you deserve.

And when that happens, we'll thank you to leave the Superior Industrial and Marine Diesels you're now holding in as nearly the same efficient condition as when you found them.

★ ★ ★



SUPERIOR ENGINE DIVISION

THE NATIONAL SUPPLY COMPANY

SALES OFFICES: Springfield, Ohio;
Philadelphia, Penna.; New York, N. Y.;
Los Angeles, Calif.; Jacksonville, Fla.;
Houston, Texas; Chicago, Ill.; Fort
Worth, Texas; Tulsa, Okla.; Boston,
Mass. **FACTORY:** Springfield, Ohio.

. . . . Continued from page 76

gree of Doctor of Engineering in 1933, and this year The Stevens Institute of Technology conferred upon him an honorary degree of Doctor of Engineering. The Drexel Institute of Technology awarded him the honorary degree of Doctor of Science, and the University of Pennsylvania conferred the honorary degree of Doctor of Science.

In 1926 King Gustav of Sweden conferred upon him the Order of Vasa, and in 1933 the Order of the North Star for cementing American-Swedish relations. In September, 1941, President Roosevelt appointed him as a special member of the American Mission to the British-American Soviet Conference in Moscow.

Batt is president of the International Committee of Scientific Management and past-president of The American Society of Mechanical Engineering. He is also chairman of the board of the American Management Association, and past-chairman of the Business Advisory Council for the Department of Commerce.

Army-Navy "E" To Elliott Ridgway Plant

COMMANDER R. G. Walling, USN, urged every American to adjust himself to the prospect of a long war and then settle down to try to shorten it as much as possible, in presenting the Army-Navy Production Award pennant to the Ridgway Plant of the Elliott Company.



"Steady, routine, day-in and day-out endeavor is required," he said. "That, with confidence in our leaders, loyalty to our immediate supe-

riors and trust in God, can alone bring us the earliest victory that is possible and save the lives of thousands of our brave fighting men." Army-Navy "E" pins were presented to the men and women of the plant by Lieutenant Colonel Thomas H. Eddy, Executive Officer of the Pittsburgh Ordnance District. Colonel Eddy told the employees that the armed forces appreciate what the Elliott Company employees have done, but asked for "more—to the limit of your ability. It may be within your power to save many lives by helping to bring this war to an end sooner—either by one week, one hour or even one minute," he said.

Howard M. Hubbard of Jeannette, President of the Elliott Company, accepted the pennant in behalf of the company and its workers. He declared that the workers at Ridgway feel they are partners with America's fighting forces and are playing a real part in speeding final victory by building equipment for submarines in greater quantity than ever before. "We are more determined today than ever," he said, "to see that the machinery the Navy has asked for is delivered on time in the quantities needed."

REMOTE CONTROL

Sperry's

HYDRAULIC

"EXACTOR CONTROL"

assures

the smallest movement being
transmitted over long distances
without backlash

Installation simple, quick, economical



Engine Fuel Injection
Governor Setting
Reverse Gear Oper. Mechanism
Electric Generators, etc.
controlled from a central station
(loads up to 100 in. lbs.)

SINGLE TUBE REPLACES:
Cables, Turnbuckles
Pulleys, Bellcranks
Push Rods, etc.

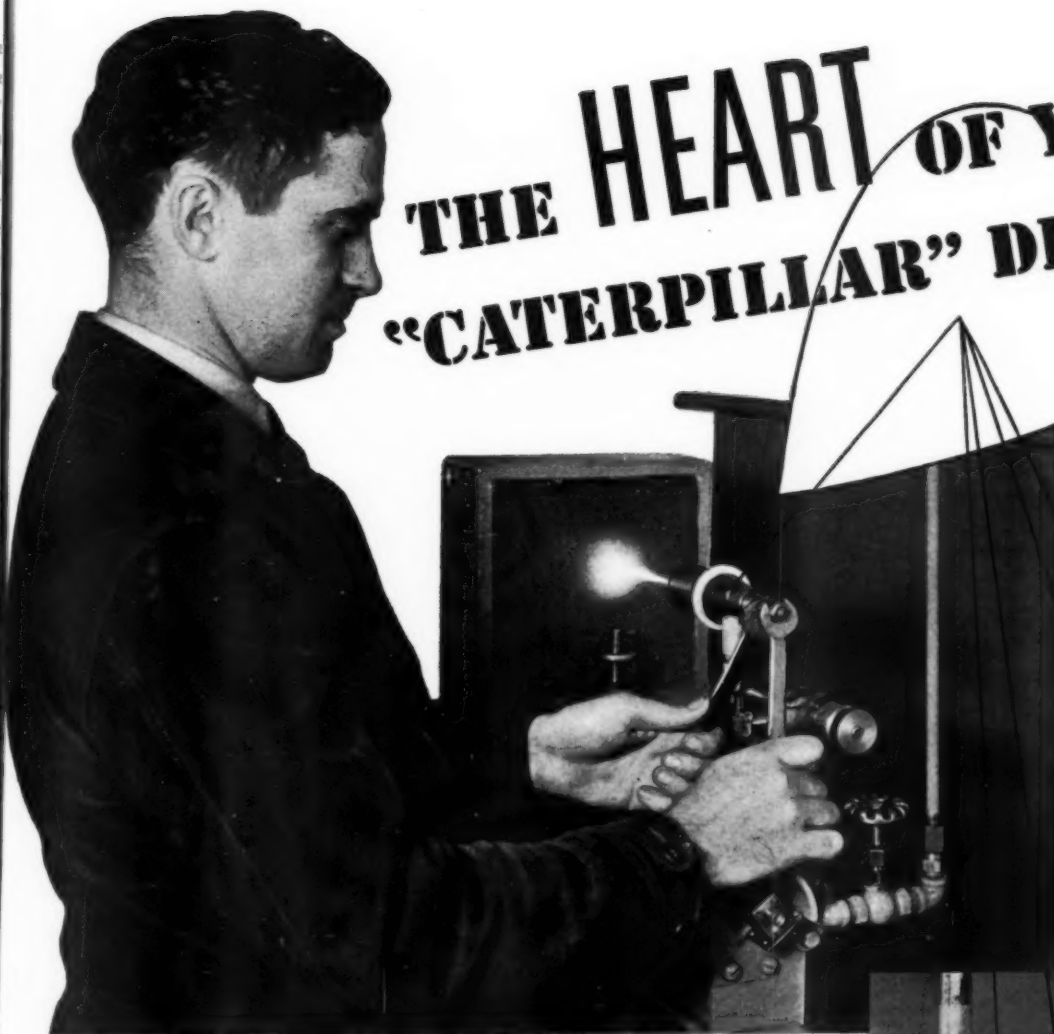


Sperry Bulletin 78-C Gives Details

SPERRY PRODUCTS, INC. • HOBOKEN, N. J.

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THE HEART OF YOUR "CATERPILLAR" DIESEL



WHAT makes your "Caterpillar" Diesel Engine "tick"? What gives it such outstanding power, flexibility, dependability and economy? Primarily it's the fuel injection system—vital heart of the engine.

The "Caterpillar" fuel system is in many ways unique. It is simple and durable, yet made with greater precision than a fine watch. It is built to give long, satisfactory service without operating adjustment. But when fuel injection pumps and valves become worn, engine performance falls off.

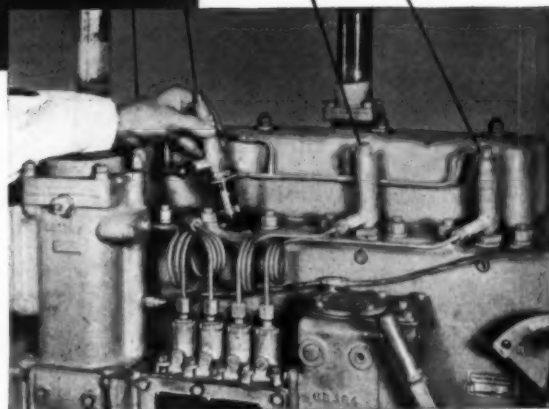
Consulting your Operator's Instruction Book and following its directions will pay dividends by insuring the long life of your fuel injection equipment. Here are some reminders:

1. Buy clean fuel and keep it clean.

2. Watch the fuel filter. Its job is to keep all foreign matter out of the fuel. As soon as the pressure gauge indicates that the filter is clogged and the flow of fuel restricted, filter should be replaced.

3. If you believe the engine's fuel injection system is in need of any kind of attention, take it to your "Caterpillar" dealer for testing. He has special equipment that shows quickly whether anything is wrong.

In times like the present, when all the nation's horsepower is working longer and harder in the victory effort, you can rely on your "Caterpillar" dealer for expert help. He has dedicated his



↑ Removing a "Caterpillar" Fuel Injection Valve is a quick, easy job. Both valves and pumps are readily accessible and easily removed for an inspection and testing.

excellent repair facilities and mechanical skill to the task of keeping your "Caterpillar" Diesel equipment on the job, without waste of time or materials, until the final battle is won.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

Cuyler S. Patton Honored

CUYLER S. PATTON of the American Locomotive Company was elected President of the Tubular Exchanger Manufacturers Association at the annual meeting held this past month in New York City.

Mr. Patton has been prominent in the activities of the Tubular Exchanger Manufacturers Association for many years and has served several terms on its executive committee. The associa-

tion has materially contributed to the war effort through standardization of tubular equipment designs and is very active in promoting increased production of these items vital to war industry.

At the American Locomotive Company Mr. Patton is Manager of Sales for the Alco Products Division. In this position he has charge of sales of heat exchangers, condensers, feed water heaters, evaporators, tubular equipment,



Cuyler S. Patton

code pressure vessels, fabricated plate work, steel water pipe and allied lines.

Mr. Patton was graduated from Cornell University in 1918 with the degree of Mechanical Engineer. He has been with the American Locomotive Company since 1929.

The Tubular Exchanger Manufacturers Association was organized to promote the interests of users and manufacturers of heat exchange equipment with regard to the best practices in design, engineering, and manufacture of heat exchangers for process industries throughout the country.

The association publishes a widely known manual, "Standards of the Tubular Manufacturers Association" which sets forth the recommended standards consistent with the safety and service requirements for the mechanical and thermal design and construction of cylindrical shell and bare tube heat exchangers.

Since heat exchangers are an integral and vital part in naval vessels and maritime ships as well as in the plants for the manufacture of synthetic rubber, aviation gasoline, chemicals, and explosives, the members of the association since the start of the war have devoted their efforts toward accelerating production of these items.

Harry K. Smyth to Manage Rogers' Edwards Company Division

REPLACING Neil S. Waterman, who has enlisted in the Army Air Corps, Harry K. Smyth has been appointed General Manager of the Edwards Company, Sanford, N. C. division of the Rogers Diesel and Aircraft Corporation.

Mr. Smyth brings to the Rogers Diesel and Aircraft Corporation a background of practical engineering experience which will be invaluable to the company in its expanding activities.

Penn
Safety Controls
for Engines

ON YOUR DESK
by Return Mail

PENN ELECTRIC SWITCH CO., GOSHEN, IND.

Gentlemen: Please send your new Bulletin E-100A without obligation to me.

Company Name _____

Individual _____

Street _____

City _____

State _____

This new bulletin—just off the press—is filled with vital information for every maker and user of internal combustion engines.

It tells how to avoid breakdown of production and damage to engines resulting from the failure of oil or cooling water systems, from any cause.

In the urgency of our war production program, such insurance, especially since it costs so little, is of utmost importance.

Send for your copy of Penn Bulletin E-100A... no obligation is involved. Write, or mail coupon today.

Penn

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS.



Harry K. Smyth

Mr. Smyth, who was graduated from the Western Australian School of Mines, obtained his first practical engineering experience in the gold fields of Kalgoorlie, Australia. In 1913, at the Australian government's request, he became Experimental and Production Engineer for a new government arsenal at Lithgow, New South Wales.

Volunteering in 1915 for service in the First World War, he was assigned to Vickers Ltd. in England as Experimental Engineer on ordnance, serving in this capacity until the Armistice. In 1919, he came to this country and then followed twenty-one years of continuous service with the two prominent machine tool manufacturers, Pratt & Whitney and Niles-Bement-Pond.

Before joining Edwards Company, Mr. Smyth was with the Cummins Engine Company of Columbus, Indiana, first in the capacity of Cummins Export Manager and later as Eastern Regional Manager.

General Electric Erie Works Wins Third Navy "E" Star

THE Erie Works of General Electric, already the possessor of every production award bestowed by the government, has just received an additional honor. The plant has been awarded the Army-Navy "E" pennant with three stars.

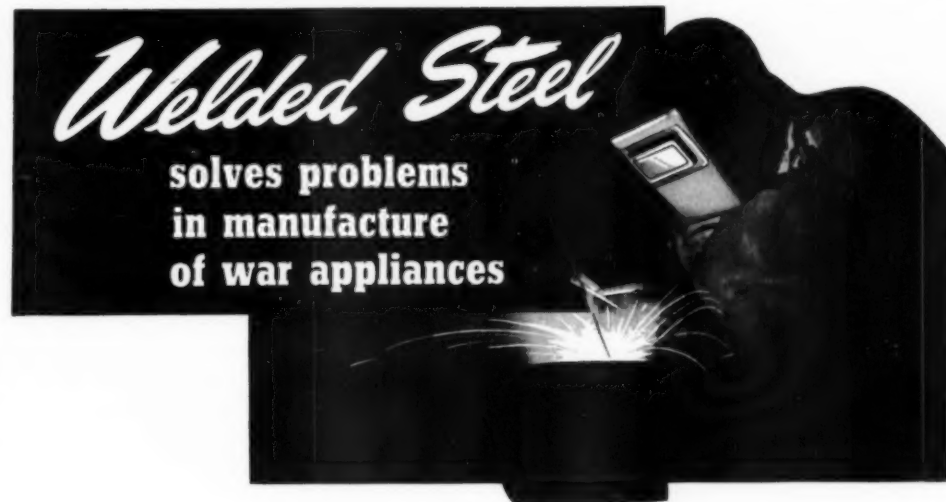
Notice of the renewal of the Army-Navy "E" and the addition of a third star to this honor pennant was contained in a letter to Works

Manager H. L. R. Emmet from C. C. Bloch, admiral USN retired, chairman of the Navy Board for Production Awards.

"The men and women of the Erie Pennsylvania Works of the General Electric Company have achieved a signal honor by continuing their splendid production in such volume as to justify this renewal of their award," wrote Admiral Bloch. "In the first instance, it was difficult to win the Army-Navy "E" and by

meriting a third renewal, the management and employees have indicated their solid determination and ability to support our forces by supplying the equipment which is necessary for ultimate victory.

"The Navy extends to each and every man and woman of your company its hearty congratulations on their accomplishment and desires to express a fervent hope that future production will be even more outstanding."



The United States Navy has been using our full production capacity since the inauguration of the Defense program. Its exacting standards are easily met by Star. Our motors and generators, because of their welded steel construction, offer greater strength, superior electrical efficiency, unlimited flexibility of application. Consider these points in post war planning:

- Light weight with strength.
- Engineered to meet special Mechanical and Electrical Requirements.

Awarded
August 15, 1942



STAR
ELECTRIC MOTOR CO.
BLOOMFIELD, NEW JERSEY

Westinghouse Air Brake Develops New Remote Control Systems

THE accumulated experience of Westinghouse Air Brake Company in the development and manufacture of pneumatic controls for the railroads of the world now is to be made available to the general industrial field, it is announced by George A. Blackmore, president.

The company's remote control systems already

have been installed in the marine field for the control of ships. Similar applications have been made on power shovels in the earth moving industry, and to help solve control problems in the mining, petroleum and machine tool industries.

Among other industries being studied under the broadened industrial program of Westinghouse Air Brake are those requiring accurate, flexible controls involving a sequence of opera-

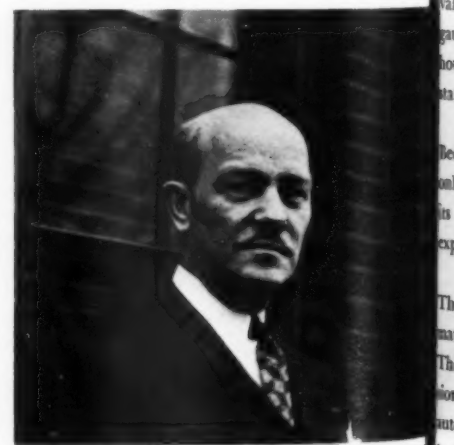
tions, such as agricultural machinery, armament equipment, automotive, aviation, building construction, ceramic, lumbering, metal working, paper manufacturing and plastic.

Development work on the new remote pneumatic control systems, supplemented when necessary by the adaptation of pneumatic hydraulic and pneumatic-electric controls, is being done by the engineering staff of the company at Wilmerding. The new systems will be marketed by the company's industrial division.

Sydney Lyon Heads Production for Wilkening

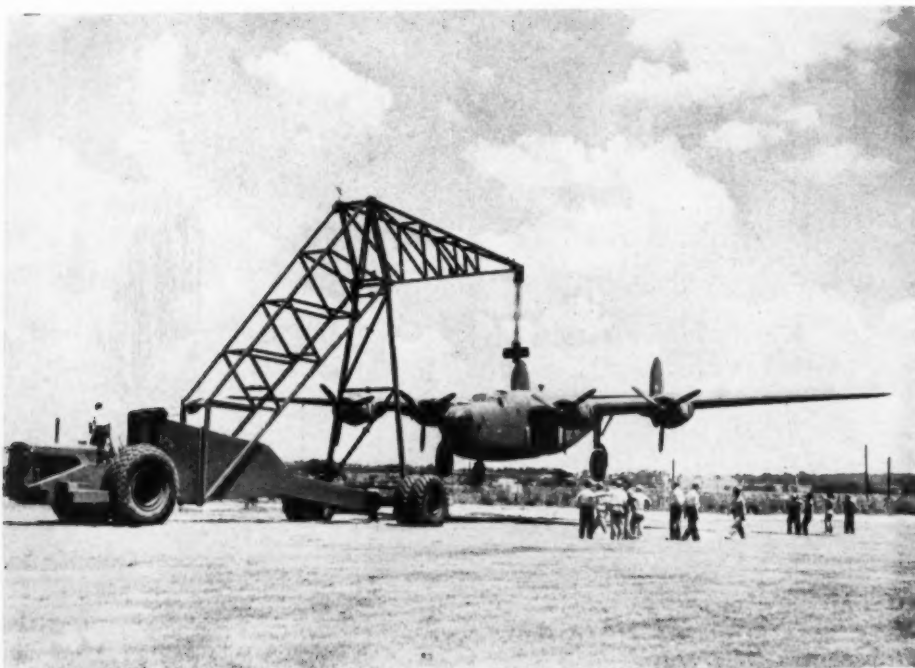
THE Board of Directors of Wilkening Manufacturing Co., maker of Pedrick piston rings, announces the election of Mr. Sydney P. Lyon as Vice-president in charge of production.

Mr. Lyon brings to the Wilkening organization a wealth of experience and a country-wide reputation for efficient, high-speed production, especially of precision parts for aircraft. He comes to Wilkening from the position of General Manager of Kellett Autogiro Corp., Philadelphia manufacturer of Autogiros and airplane parts. Previously, he was Production Manager of the Glenn L. Martin Co., airplane manufacturer of Baltimore, Md., assistant General Manager of Thomas-Morse Aircraft Corp. of Buffalo, N. Y., one of the first concerns to manufacture all-metal aircraft, and was associated also with the Army Air Force at Wright Field in Dayton, Ohio.



Sydney P. Lyon

Mr. Lyon is a native of Jeffersonville, Ind. and studied mechanical engineering at the Armour Institute of Technology in Chicago. He will be in charge of all production of Pedrick piston rings for both war and civilian requirements at the Wilkening factories in Philadelphia, Pa. and Scranton, Pa.



CLEARING AIRFIELDS FOR ACTION! with a Bomber TOURNACRANE powered by Cummins Diesel, equipped with NUGENT FILTERS

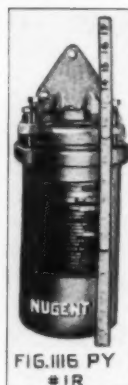


Here is one of Uncle Sam's new "implements" of war... a B-30 (Bomber) Tournacrane being put through its paces in recent Army tests. It is used to demonstrate how runways and airfields may be cleared of crashed planes by merely picking them up and carrying them away.

Nugent Fuel Oil Filters help keep the Cummins Diesel, which powers the Tournacrane, operating with maximum dependability and efficiency. This is but one way in which Nugent Filters are aiding the war effort. Throughout many industries Nugent filters and oiling devices are helping to conserve both lubricating oils and fuel oils. Perhaps we can help you on your specific problems. Write today.

Wm. W. Nugent & Co., Inc.
Established 1897
415 N. Hermitage Ave., Chicago, Ill.

NUGENT FILTERS



Above is a Nugent Pressure Filter of the type used on Cummins Diesels to keep fuel oil lines clean. Also shown is a filter cartridge used in this unit. Patented design and construction gives this unit 468 sq. in. of filtering area.



Exide Announces Complete Emergency Lighting Unit for War-Time Service

REQUIRING no fixtures or wiring other than plug-in connections to the A.C. supply, the new Exide Lightguard Emergency Lighting Unit for war-time service is announced by The Electric Storage Battery Company, Philadelphia.

It has been designed to meet the need for a source of emergency light in war plants, arsenals, ordnance plants, shipyards, factories, and other places where war-time activity has increased the potential dangers resulting from power-line failure, fires, and sabotage. It throws a beam of light 50 ft. wide a distance of 150 to 200 feet, covering an area of 7,500 sq. feet.

With power lines loaded to capacity, plant feeders are in many cases overloaded, needing only a slight upsetting load condition to produce a lighting failure. When the lights go out and machinery continues to run on momentum, the Lightguard, by automatically switching on a broad beam of light, helps to reduce the accident hazard, particularly in those plants where men and women unfamiliar with machinery are working. It is particularly useful in windowless plants, many of which have been built recently.

The Exide Lightguard has been designed for use where workers are employed at night on machines, particularly in crowded spaces; for emergency lighting at control equipment, electrical or mechanical, such as power switchboards, telephone switchboards, pumps and valves; in boiler and engine rooms for reading gauges and operating valves; in plant gate houses, entrance and exit locations; first-aid stations, and plant dispensaries.

Because it is a self-contained unit weighing only 47 pounds, it can easily be moved from its customary position during a fire, accident, explosion or air-raid, for use in rescue work.

The new unit operates instantly and automatically without a hand touching a switch. The only maintenance required is the occasional adding of water. Recharging is done automatically by trickle charge. State of charge is clearly indicated by pilot balls.

Illumination is provided by a sealed-glass type, prefocused auxiliary driving lamp (Mazda 4010) similar to those used on modern automobiles. For that reason, a replacement, if necessary, can be obtained at most automobile accessory stores.

The unit measures overall 16½" long x 6¼" wide x 18" high. The battery is a long-lived 3-cell Exide, type KZHGR-7 with thick plates assembled in a glass jar.

Descriptive literature may be obtained by addressing The Electric Storage Battery Company, 19th Street and Allegheny Avenue, Philadelphia.

Westinghouse Science Short

A SINGLE layer of oxygen atoms on a sliver of steel the size of a safety razor blade can be weighed by a sensitive balance in the Westinghouse Research Laboratories. Such a layer weighs two hundred-millionths of an ounce, or about a hundredth as much as a speck of pepper.

For Continuing Achievement

A
**STAR
FOR
WESTON**



—evidence that the vital instrument situation rests in good hands!

A star now adorns the ARMY-NAVY "E" pennant awarded to WESTON just 6 months ago . . . the first such pennant awarded in this highly specialized instrument field.

It's a star that has *real meaning*. Because, from the very beginning of our defense period, the responsibility for producing the vast quantities of instruments vital to the success of our country's efforts, has rested largely on the instrument leader.

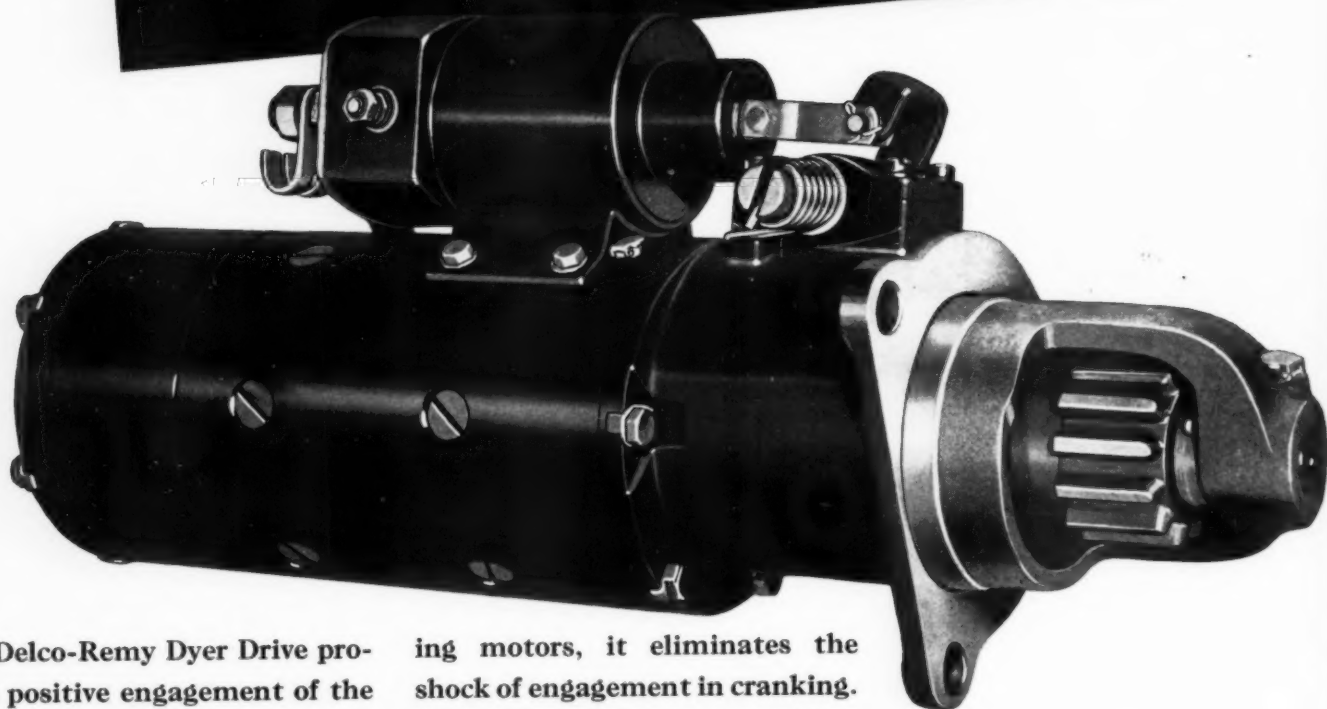
This star signifies that the responsibility *rests in good hands*. "The men and women of the WESTON Electrical Instrument Corporation," writes the Chairman of the Navy Board for Production Awards, "have achieved a signal honor by continuing their splendid production in such volume as to justify this award . . . indicating their solid determination and ability to support our fighting forces with equipment necessary for victory."

But a great instrument task still remains . . . before victory is ours. So WESTON workers continue reaching for new goals . . . with the same determination, the same painstaking devotion to the quality ideal, responsible for WESTON'S *continuing leadership* in the instrument field.

WESTON ELECTRICAL INSTRUMENT CORPORATION, NEWARK, NEW JERSEY

Engineered to Diesel Engine Requirements

DELCO-REMY DIESEL CRANKING MOTORS WITH DYER DRIVE



The Delco-Remy Dyer Drive provides positive engagement of the cranking motor pinion with the engine flywheel before cranking begins. It is an example of Delco-Remy "know-how" applied to Diesel electrical equipment. Designed as an integral part of Delco-Remy heavy-duty crank-

ing motors, it eliminates the shock of engagement in cranking. Delco-Remy Diesel cranking motors with Dyer Drive are characterized throughout by ruggedness and simplicity of design. They are built to meet the requirements of engines up to 9000-cubic-inch displacement.



Service on Delco-Remy equipment is available through United Motors Service.

CRANKING MOTORS • GENERATORS • REGULATORS • BATTERIES For Heavy-Duty Diesel Service

Delco-Remy

DIVISION, GENERAL MOTORS CORPORATION
ANDERSON, INDIANA

BUILDER OF AUTOMOTIVE, AVIATION AND DIESEL ELECTRICAL EQUIPMENT

New Lin
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A NEW lin
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Special equi
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Succeeding
active duty.

New Line of Vertical Hollow Shaft Explosion Proof Motors Announced by Fairbanks, Morse & Co.

A NEW line of vertical hollow shaft explosion proof motors is now offered by Fairbanks, Morse & Co. for operation in Underwriters' Class I Group D hazardous gas locations. These motors are designed primarily for pumps handling large quantities of volatile materials such as high octane aviation gasoline.



Special equipment is required for the efficient handling of gasoline in fueling planes at each of our numerous air fields, as well as for transferring gasoline from tankers to storage locations at our various outposts throughout the world. Numerous applications are arising requiring motors designed to prevent explosions and fires and Fairbanks-Morse horizontal and vertical explosion proof motors are recommended to minimize this hazard.

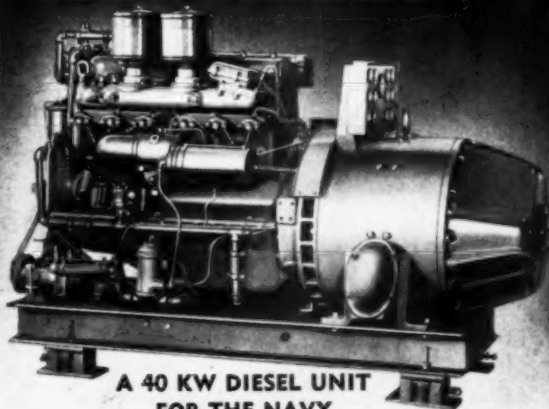
New General Manager is Named by Cummins

THE Cummins Engine Company of Columbus, Indiana, manufacturers of Cummins Diesel Engines, recently announced several changes in executive personnel, two of them created by the resignation of J. I. Miller, vice president and general manager, to accept the commission of lieutenant in the United States Naval Reserve.

Succeeding Lieutenant Miller, who is now on active duty, is V. E. McMullen, former works

**LIFE SAVERS
COST SAVERS**

*...in War
...in Peace*

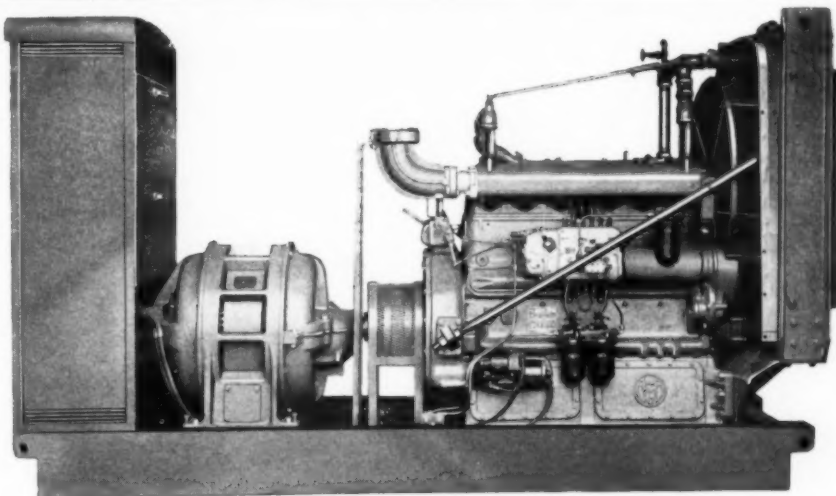


A 40 KW DIESEL UNIT
FOR THE NAVY

U. S. Electric Plants in service throughout the far-flung battle fronts are, literally, life savers. For, modern warfare is "run" by electricity — telephones, radios, listening devices, search lights, automatic equipment. After the war, these powerful U. S. Plants will go back to their regular job of saving power and lighting costs for industrial and commercial users.

U. S. MOTORS CORP.
OSHKOSH, WIS.

**U. S. DIESEL
ELECTRIC PLANTS**



ENGINE GENERATOR SETS

5 KW. TO 100 KW.

Duplex Truck Co.
Lansing, Michigan

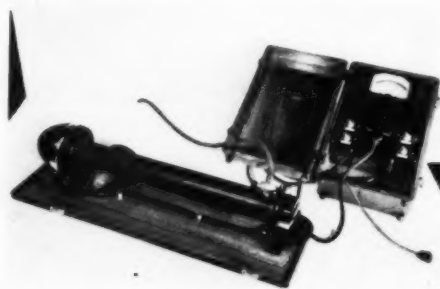
manager for the company. Taking Mr. McMullen's place as works manager is Carl R. Fox, who advances from the position of assistant works manager. Other changes find J. D. Allen, credit manager, elevated to the post of assistant sales manager and K. M. Leech, sales engineer, promoted to assistant service manager.

Mr. McMullen, since his graduation from the University of Wisconsin 37 years ago, has been continuously engaged in the engine manufacturing business. He joined the Cummins Engine Company in 1935, serving as works manager until his recent appointment as vice president and general manager. Mr. Fox's affiliation with Cummins dates back to 1934. Prior to that time he was connected with several prominent automobile manufacturers.

Both Mr. Allen and Mr. Leech are well known to equipment manufacturers and Cummins Diesel owners through their former activities in the credit and sales departments, respectively. Mr. Allen formerly was associated with a major truck manufacturer. Mr. Leech, a graduate of Iowa State University in the school of electrical engineering, joined the Cummins sales organization in 1939.

Photoelectric Smoke Meter Developed At Penn State

THE Photovolt Photoelectric Smoke Meter is designed to furnish an objective indication of the density of smoke, independently of individual judgment and of light conditions. The Smoke Meter has been developed originally for testing the smoke of Diesel engines. It is, however, not restricted to this application but will be found equally useful in conjunction with other internal combustion engines as well as with furnaces and wherever the light obstructing properties of suspended particles in a gas are to be registered.



The design of the instrument is based on the Smoke Meter developed in the Diesel Laboratory of Pennsylvania State College and previously described by Prof. P. H. Schweitzer, in various publications.

The Photoelectric Smoke Meter requires no installation except for a tube connection leading from the exhaust pipe of the Diesel to the inlet of the instrument. The equipment comprises two units in portable housing which can easily be carried by one person. It can be operated from a 105-125 Volt 50-60 cycle AC power line or from a storage battery.

Smoke density, percent has been defined as the percent reduction in light caused by the light passing through an 18" column of exhaust gas. The exhaust gas enters the tube near the one end and leaves at a point near the other end. Light from a 6 Volt lamp enters the tube in the axial direction from the side of the gas outlet and strikes the light-sensitive layer of a photocell provided on the other end of the tube. The current output of the photocell is registered by a sensitive microammeter. With clean air in the tube, the instrument is adjusted so as to show full scale deflection on the indicating instrument, the latter being provided with 100-0 scale having the zero mark at the right end. After the tube is filled with exhaust gas, the needle moves to the left, and its indication is read directly as smoke density, percent. Write Photovolt Corporation, 95 Madison Ave. New York, N. Y. for full particulars.

H. O. Penn Heads New Caterpillar Distributor in Michigan

THE Michigan Tractor and Machinery Co., with headquarters in Detroit and a branch established at Grand Rapids, has been organized to serve as distributor for "Caterpillar" and allied machinery and equipment in the Lower Peninsula of Michigan, it is announced by Caterpillar Tractor Co.



H. O. Penn

MORE POWER TO YOUR DIESELS!

HALL

The job diesels of every type are doing these days, under the stress and strain of extra loads and extra operating hours, is a tribute to the ability of their manufacturers.

Keeping thousands of those diesels in power plants, ships, trains, trucks, etc., delivering maximum power under all conditions with a minimum of fuel consumption and "time-out" for servicing, is HALL Valve Servicing Equipment.

With the coming Victory, HALL Equipment will again be readily available. In the meantime, we're devoting our production facilities to winning the war but we'll be glad to give you complete information on how HALL Equipment can fit your post-war needs.

THE HALL MANUFACTURING CO., TOLEDO, OHIO

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The new company is headed by H. O. Penn, president of the H. O. Penn Machinery Company, Inc., New York, and until recently supervisor of the tractor and used construction machinery division of the War Production Board, Washington, D. C.

G. E. Rinck, who has been eastern sales manager for "Caterpillar," and was formerly vice president of the Dakota Tractor & Equipment Co. at Fargo, North Dakota, is vice president of the firm. R. E. Reed, former deputy procurement officer in Pennsylvania, and WPB chief, used construction machinery section, is secretary-treasurer.

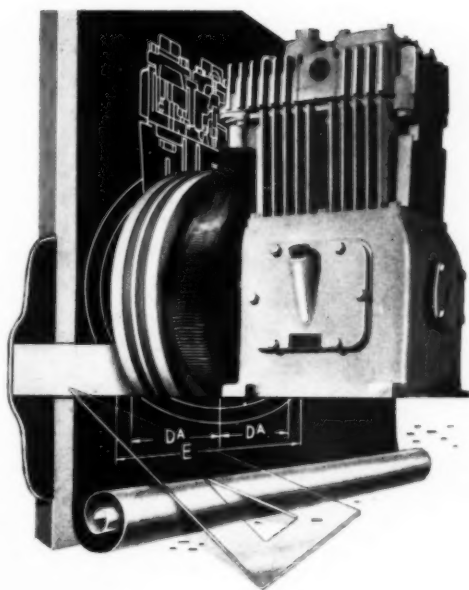


G. E. Rinck

A major portion of the personnel of the Keller Tractor and Equipment Company, former distributor for "Caterpillar" and allied manufacturers, has associated itself with Michigan Tractor and Machinery Co.

Don F. Nickel has been named manager of the branch at Grand Rapids. Louis Eilertsen will continue to handle the northern and central Michigan territory. Harry Armstrong is representative in the Detroit district and Burt Koss has been appointed service and parts manager for Detroit.

The new company is now settled in its headquarters at 14341 Schaefer Highway, Detroit, and in its branch office at Grand Rapids, which was formerly occupied by Keller Tractor and Equipment Company. Both are modern, up-to-the-minute establishments carrying complete stocks of parts and equipment. They have ample parts and service facilities and the "know how" for providing the best possible servicing of machinery to "keep 'em working" in these days.



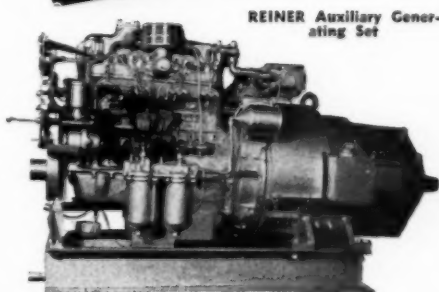
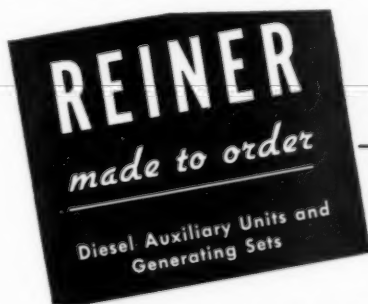
1st in Design

"TOPS" IN DEPENDABILITY

QUINCY was the *first* to design an air compressor that combined modern appearance with improved mechanical features. Construction is simpler. Radiation area is increased 12%. Lubrication is more thorough—more positive. Quincy builds air compressors *exclusively*. This policy of specialization has made the name "Quincy" a symbol for dependability. Quincy Compressors provide air for Diesel starting and other services requiring intermittent pressures up to 500 lbs. per sq. inch. If you have compressed air problems, let our specialists help you solve them!

Quincy
COMPRESSORS

QUINCY COMPRESSOR CO., Dept. K-5 • QUINCY, ILLINOIS



REINER Auxiliary Generating Set



REINER Auxiliary Unit

On the practical assumption that Auxiliary Units requirements often differ widely, we have developed our business largely along the lines of "made to order" Auxiliary Units and Generating Sets.

REINER Units are not standardized as the term is commonly used. That is, they're not "shelf-goods." They are soundly engineered units of standard equipment long favorably known and widely accepted by industry. When you buy a REINER Unit or Generating Set you get REINER engineering skill making the most of Engines, Pumps, Generators, Compressors, etc.

Ratings of REINER Units range from 3 to 75 kw for any standard voltage, and with various sizes of Compressors, Pumps and other Auxiliaries.

When requirements can fit into a standardized picture, we also have such units available in a wide range of sizes.

John REINER & Company

12-12 37th Ave., Long Island City, N. Y.

S-RC-7

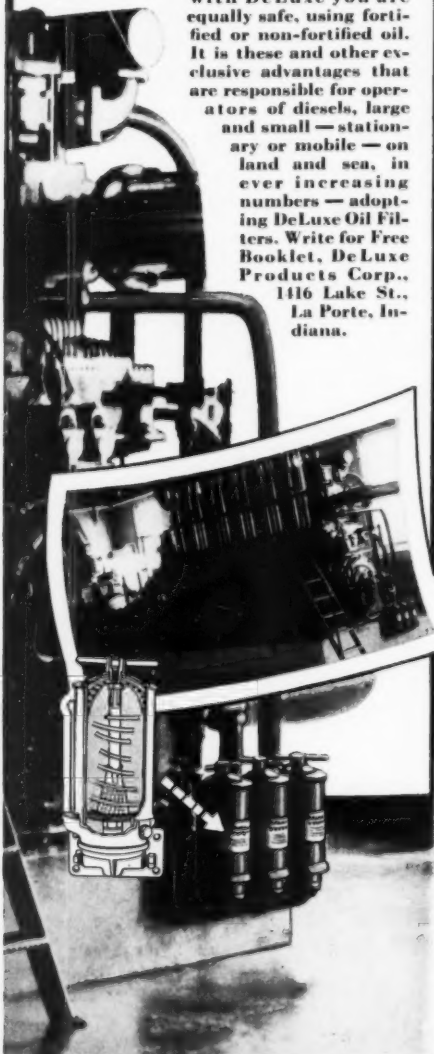
"Get the Jump"

on Oil Contamination with

DELUXE Oil Cleansing!

Don't give that engine-performance-enemy, "oil-contamination" a chance even to start its work of shortening bearing and piston life and causing engine shut-downs. DeLuxe Oil Filters are built to cleanse oil of those contaminating asphaltenes before they can join with other substances to produce sludge and engine varnish. Only DeLuxe embodies all eight oil cleansing principles essential to the prevention of engine troubles at their source.

With DeLuxe you are equally safe, using fortified or non-fortified oil. It is these and other exclusive advantages that are responsible for operators of diesels, large and small — stationary or mobile — on land and sea, in ever increasing numbers — adopting DeLuxe Oil Filters. Write for Free Booklet, DeLuxe Products Corp., 1116 Lake St., La Porte, Indiana.



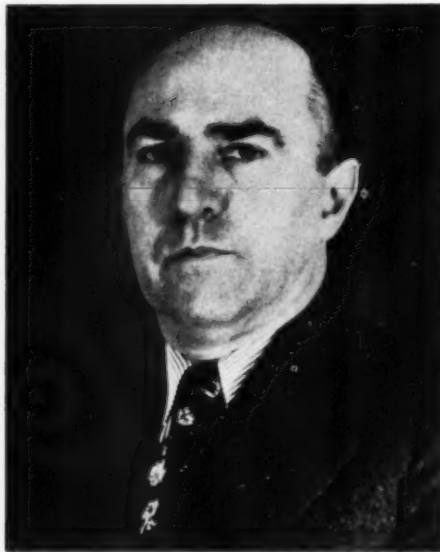
DELUXE OIL FILTER

DOES MORE THAN STRAIN OIL
... MORE THAN FILTER OIL

Actually Cleanses Oil!

Detroit Lubricator Appoints E. J. Doucet

DETROIT Lubricator Company announces the appointment of Mr. E. J. Doucet, as General Sales Manager.



E. J. Doucet

Mr. Doucet has been associated with Detroit Lubricator Company for the past 26 years, and until two years ago was in charge of oil burner equipment sales for the Western territory with headquarters at the company's Chicago office. Subsequently, Mr. Doucet was transferred to the main office at Detroit where he held the position of Sales Manager in the Oil Burner Equipment Division, and then Sales Assistant to the President, which position he held up to the time of his present appointment as General Sales Manager.

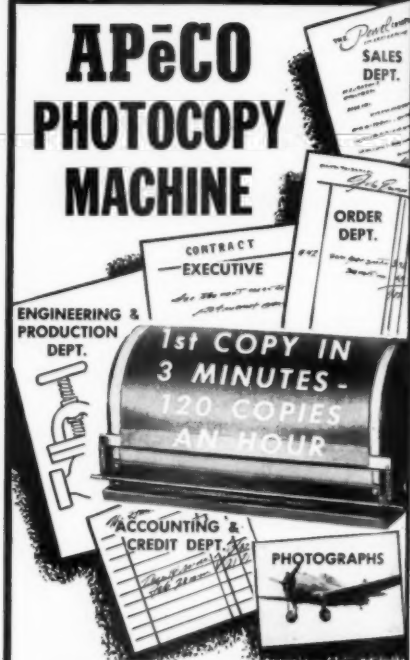
Guiberson Predicts Diesel Planes

GIANT American transport airplanes powered by Diesel engines carrying cargoes to the remote corners of the world were prophesied by Allen Guiberson, executive vice-president of the Guiberson Diesel Engine Company at the annual meeting of the stockholders of that company. Diesel engines with their safety, economy and long cruising range, will propel huge ships now under development by our leading aircraft companies, Guiberson stated.

The Guiberson Diesel Engine Company, builders of America's only radial air-cooled Diesel engine, developed for aircraft, is now devoting all of its production in its Illinois plant for light tank engines, with which many important battles of this war have been won, Mr. Guiberson told the stockholders. The research

Save Man-Power in Every Department with

APeCO PHOTOCOPY MACHINE



ONE PERSON WITH APeCO CAN DO THE WORK OF MANY

Here is a machine that multiplies Man-Power — releasing men, women and their equipment for other work. Speeds up your production! Saves valuable hours now spent on copying and tracing by making photo-exact copies at small expense. Get copies right in your own place of business, without delays.

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**SAVES TIME
IN COPYING**
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— other papers

APeCO makes copies up to 18"x22" — 1 to 100 copies or more. No chance for error! No need for proofreading! Legally acceptable. Used by leaders throughout industry.

FOOLPROOF OPERATION!

With our simple instructions, any office boy or girl can produce perfect, photo-exact copies of letters, blueprints, specifications, drawings, etc. No special skill or dark room is needed.

PROMPT DELIVERY — on machines and supplies. Learn how others in your field have benefited. Write for **FREE** folder now! Representatives in all principal cities and Canada.

\$55
E.O.B. CHICAGO

AMERICAN PHOTOCOPY EQUIPMENT COMPANY

2849 N. Clark St. Dept. DH-1 Chicago, Ill.

CRACKED BLOCKS AND HEADS

*Fix 'em so they'll
Stay Fixed!*

USE THE **K&W**
MECHANICAL METHOD

*Guaranteed
for the life of the Motor*

**The days of temporary repairs
to cracked cylinder blocks
and heads are gone forever:**

No longer is it necessary to experiment
with makeshift and unreliable methods on
equipment that cannot be replaced.

So why take chances and unnecessary
risks? Play safe! Be sure! Get **permanent**
results by using the K & W Mechanical
Method recommended by motor manufac-
turers. Proved by years of test in hundreds
of bus, truck and tractor motors and sta-
tionary engines of all kinds. Amazingly
easy to use . . . does the work for a frac-
tion of what a new block or head would
cost. Saves time and money.

Even if replacements were easy to get
it would pay you to use this method. Get
the facts today. It is available in most
localities through K & W Licensed Repair
Stations and also our Factory Service Di-
vision at Bloomington, Indiana. Consult
your jobber or write us for complete details.

NOTE — For fleet operators who
prefer doing their own repair work,
we offer tools, material and special
training to use this method under
our patents.



KERKLING & COMPANY, INC.
BLOOMINGTON, INDIANA

Manufacturer of K & W Metallic Seal and
Licensor of K & W Mechanical Method

and development of the Guiberson engine for
planes, ships and land vehicles will continue
at the Dallas plant, Guiberson reported.

The stockholders voted to re-elect all company
directors. Directors in session following the
stockholders' meeting re-elected S. A. Guiber-
son, Jr., founder of the Guiberson interests,
president of the company, and Allen Guiber-
son, executive vice-president. Other officers
were re-elected. They are: N. G. Guiberson,
vice-president; Harry S. Zane, Jr., vice-presi-
dent; Alex P. Smith, vice-president and con-
troller; and R. D. Wallis, secretary-treasurer.

L. Fred Iverson

L. FRED IVERSON, 61, associated with the
Sealed Power Corporation, Muskegon, Michi-
gan, since 1916 and well known in the replace-
ment parts industry, died at his home on
March 17.



L. Fred Iverson

From 1922 to 1935 Mr. Iverson was General
Manager of the Service Division of Sealed
Power and while serving in that capacity, he
was very active in association activities. He
was director of the old A.E.A. and was chair-
man of one of the first N.S.P.A. show commit-
tees. In 1935 Mr. Iverson became purchasing
agent of the company and served in that capac-
ity until his death.

He is survived by his wife and two sons, Cpl.
L. Fred Iverson Jr., Fort Riley, Kansas, and
Andrew R. Iverson serving with the Coast
Guard at Providence, Rhode Island.

SPECIFY **HILCO** FOR LUBRICATING OIL PURIFYING

A complete line of lube oil puri-
fiers using Fullers Earth — cotton
waste and specially prepared fil-
tering agents.

HILCO OIL RECLAIMERS

A simple, economical
and foolproof method
of restoring contami-
nated oil to the full
value of new oil. — for
direct connecting to
one or more Diesel
engines for contin-
uous or intermittent
operation.



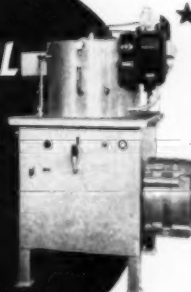
HILCO HYFLOW OIL FILTERS

A superior oil filter for
perfect filtering of Diesel
engine lube oil — for di-
rect-connecting to one
or more engines — con-
tinuous or intermittent
operation.



HILCO AIRLINE OIL PURIFIERS

A perfect method
for contact oil puri-
fying for complete
oil reconditioning.
For batch purifying
directly from en-
gine lube oil sys-
tem or transfer
tanks.



The Hilco line offers you a complete lubri-
cating oil purifier service. Write today for
free literature and see what Hilco opera-
tors are doing — then let us help you select
a Hilco to take care of "That Particular
Job."

OIL PURIFIER HEADQUARTERS

THE
HILLIARD Corporation
122 W. 4th ST., ELMIRA, N. Y.

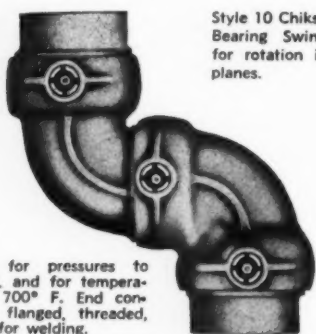
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CHIKSAN Ball-Bearing Swing Joints are "just what the skipper ordered" for fuel, oil, water, starter and soot-blower lines on Diesel Engines.

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CHIKSAN Swing Joints are ideal for these purposes because they are not affected by vibration under pressure. Smooth, easy turning is provided by double rows of ball bearings. There is nothing to shake loose . . . nothing to tighten or adjust. Pack-off is so efficient that the same lines can be used for both suction or pressure service.



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CHIKSAN TOOL COMPANY
BALL BEARING SWING JOINTS
for ALL PURPOSES
BREA, CALIFORNIA

West Coast Diesel News

HERCULES four-cylinder, 40-hp. Diesels have been installed in four Van Camp Company's tuna vessels plying out of San Pedro, California, harbor. They are: *San Joaquin*, *Milwaukee*, *Queen*, and *Robin*. They will operate Carrier-Brunswick refrigeration compressors.

TWO new 85-foot purse seine boats to be powered with 240 hp. Washington Diesels are under construction at the Marine View Boat Building Company and the Puget Sound Shipyard for John Breskovich of Tacoma, Washington.

THE San Diego, California, 38-foot fish boat *Tux* owned by ex-diver Jimmy Lee has been repowered with a Caterpillar marine Diesel of 35 hp.

INTO the 55-foot trawler *Hydah* now under construction by the Shain Yard, Seattle, Washington, goes a Mack marine Diesel of 100 hp. She will fish Alaskan waters.

THE Lipsett Engine and Manufacturing Co., Vancouver, B. C., have been appointed Mack marine Diesel engine distributors for the north Canadian coast including Yukon Territory. Alfred Van Snellenberger is manager.

Dresser Industries Quarterly Report

THE combined sales volume of the companies comprising Dresser Industries for the three months ended January 31 amounted to \$13,334,039, or three times the sales for the corresponding period a year ago, according to H. N. Mallon, president of Dresser Manufacturing Company, in a quarterly report recently mailed to stockholders.

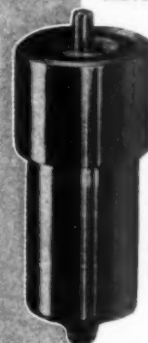
Consolidated net profit from the operations of Dresser Manufacturing Company and subsidiaries for the first quarter, after provisions for taxes, was \$518,077, equivalent to \$1.55 per share on 335,000 shares of capital stock outstanding. This compares with \$299,692, or 89 cents per share, for the three months ended January 31, 1942.

Manufacturing costs multiplied more than three and one-half times, principally due to wage increases, and in part to the demands for war production that "involve a margin of extra cost that is preferable to delay in turning out finished products."

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FUEL INJECTION EQUIPMENT

Demco design, manufacture and test are based on the ultra-precise requirements of effective Diesel fuel injection. Demco fuel injection units are characterized by compactness and clean, simple design, highest quality materials, superb workmanship.



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Nozzles are made in three sizes, with flat seated needles of standard or non-corrosive materials. No. 4 nozzle is self-cooling.



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Fuel injectors are hydraulically operated, differential, closed type and are made in various lengths with three standard shank diameters.



Demco Fuel Injection Pumps

"PH" fuel injection pumps are port controlled type; they are adaptable to a wide range of Diesels with minor adjustment of timing.

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1-80 HP Atlas*	1-210 HP Superior
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Tax provisions, after giving effect to a \$126,871 postwar refund, amounted to \$1,254,918, equivalent to \$3.75 per share. This tax liability was nearly two and one-half times net profit.

Backlog of orders at March 1 amounted to more than \$43,500,000.

The output of Dresser Industries includes new war material such as tank and airplane components for military purposes. Normal products, such as engines for aviation gasoline and heaters for Army camps, are being produced to meet military needs, while other products for the gas, oil and water industries are in the classification of national defense.

Companies comprising Dresser Industries are Dresser Manufacturing Company, Bradford, Pa.; The Bryant Heater Company, Cleveland, Ohio; Clark Bros. Inc., Olean, N. Y.; Pacific Pump Works, Huntington Park, Calif.; Bovaird & Seyfang Manufacturing Company, Bradford, Pa.; Dresser Manufacturing Company, Ltd., Toronto, Canada; and Van der Horst Corporation, Olean, N. Y.

Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

Conducted by C. CALVERT HINES*

2,306,364

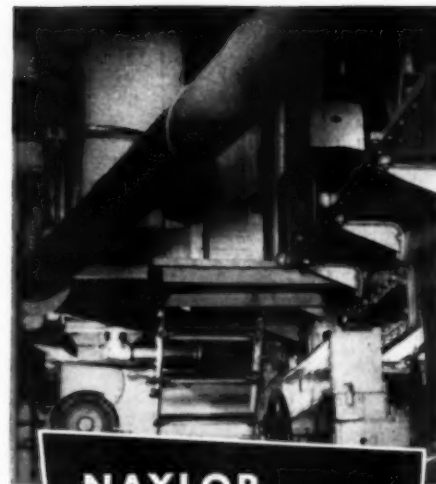
INTERRUPTION INJECTION PUMP AND METHOD TO APPLY THE SAME

Nikolai N. Skaredoff, New York, N. Y., assignor of forty one-hundredths to George A. Rubissow, New York, N. Y.

Application June 27, 1940, Serial No. 342,638
2 Claims. (Cl. 103-41)



1. In a fuel injection pump of an internal combustion engine, having a piston reciprocating in a cylinder provided with at least one suction port for the admission of the fuel into the working chamber of said pump, characterized by means comprising: a piston provided with at least one preferably concentric groove near the top of the said piston of the said pump, a passage provided in the interior of the body of the said piston establishing a communicating passage between the said groove and the head of the said piston, whereby when the said groove registers with at least one said suction port of the said pump, there is provided an interruption of the delivery of fuel during the time said groove is in register with said suction port in the barrel of the said pump.



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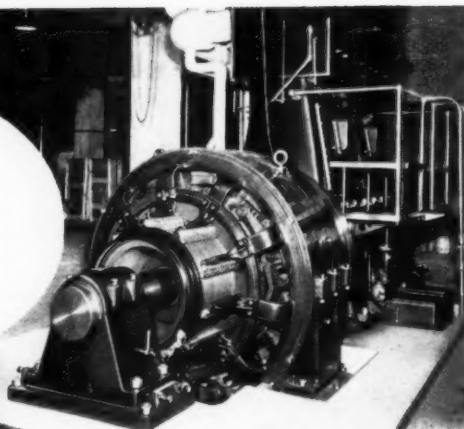
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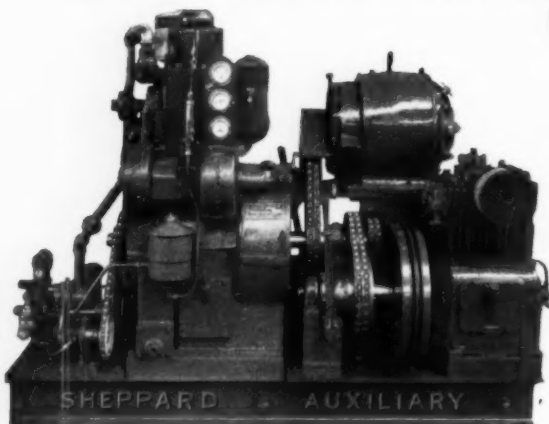
BURKE, not one of the biggest names in generator construction, but certainly one of the oldest, has always been known for quality rather than quantity. Today, with the spur to more power in a hurry, Burke quality goes into 24-hour production lines to provide Diesel Engine users with a husky well-built A.C. or D.C. Generator or Motor to meet any specified conditions up to 1000 K.W. or 1000 H.P. Write for specific information.

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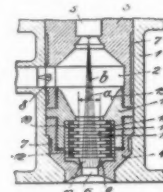
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2,305,791
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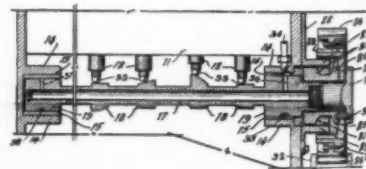
Herbert Maruhn, Stuttgart-Bad Cannstatt, Germany; vested in the Alien Property Custodian Application January 7, 1939, Serial No. 219,802 In Germany January 5, 1938 11 Claims. (Cl. 123-33)



4. In an internal combustion engine having a combustion chamber, a single compartment primary explosion cell, and an injection nozzle opening into said cell at one side thereof, a connecting channel extending from the side of said cell opposite the mouth of the injection nozzle to the combustion chamber substantially in axial alignment with the fuel jet traversing the cell in direct contact with the main mass of air therein, said channel having an axial passage permanently open during the operation of the engine and of a diameter considerably smaller than that of said cell, the inner wall of said passage being peripherally grooved to provide a plurality of peripheral substantially parallel recesses of a radial depth and axial width to exert on said fuel jet in said passage a throttling action which increases with increasing velocity of the fuel jet, said peripheral recesses being axially spaced to leave between them alternate peripheral and substantially parallel wall portions of an inner diameter smaller than that of said recesses.

2,307,926
CAMSHAFT FOR INTERNAL COMBUSTION ENGINES

James E. Griffith and Edward Ronald Burke, Denver, Colo.; said Burke assignor to said Griffith Application June 15, 1940, Serial No. 340,708 8 Claims. (Cl. 123-90)



2. In an internal combustion engine having a plurality of valve tappets arranged in alignment along a valve cam shaft; means for rotating said shaft; and means for reciprocating said shaft forward and back longitudinally at every revolution thereof, said reciprocation and rotation constituting necessary components of movement for the operation of said valve tappets.

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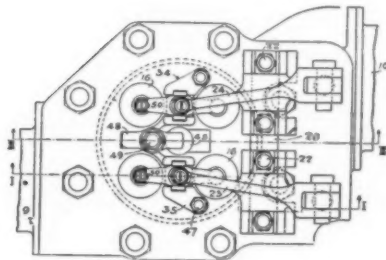
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2,309,291
INTERNAL COMBUSTION ENGINE
John W. Anderson, Auburn, N. Y., and Ralph J. Hooker, Manchester, Conn., assignors to American Locomotive Company, New York, N. Y., a corporation of New York
Application October 10, 1941, Serial No. 414,434
5 Claims. (Cl. 123-90)



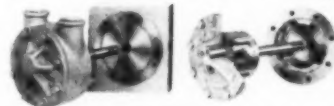
3. An internal combustion engine comprising a cylinder; a cylinder head; dual inlet and dual exhaust valves in said head having their stems extending therebeyond in spaced relation about the center of said head; a fuel injector nozzle disposed at said center, having a pipe connection extending from one side directed toward the space between an inlet valve stem and an exhaust valve stem adjacent thereto; a crosshead for the inlet valves; a crosshead for the exhaust valves; a unitary crosshead guide device having a yoke between the other of said inlet and exhaust valve stems, and at the side of said nozzle opposite said pipe connection side, a crosshead guide within the space between said inlet valve stems for said inlet valve crosshead, formed integral with one branch of said yoke, and another crosshead guide within the space between said exhaust valve stems for said exhaust valve crosshead, formed integral with the other branch of said yoke, said crosshead guides being disposed respectively opposite the other sides of said nozzle; and means securing said device to said head.

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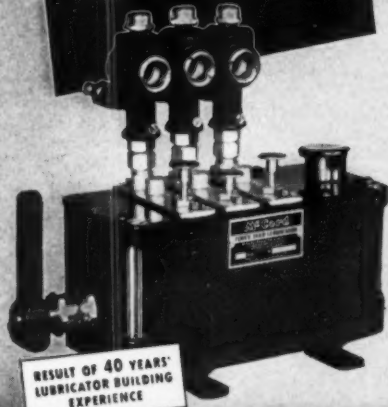
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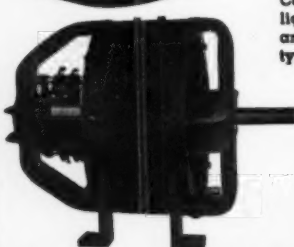
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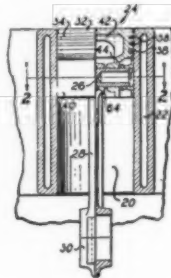
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2,308,178
PISTON

Floyd F. Kishline, Kenosha, Wis., assignor to Nash-Kelvinator Corporation, Kenosha, Wis., a corporation of Maryland
Application April 11, 1941, Serial No. 388,001
6 Claims. (Cl. 309-15)



1. A piston for an internal combustion engine comprising a cylindrical compression head member having a closed face, a cylindrical skirt member, spaced arms formed on one of said members and extending into the other of said members, a pin extending through said arms and the side wall of the other of said members so as to permit relative rocking movement of said members about said pin, and spring means carried by one of said members and engaging the other of said members around one edge thereof.

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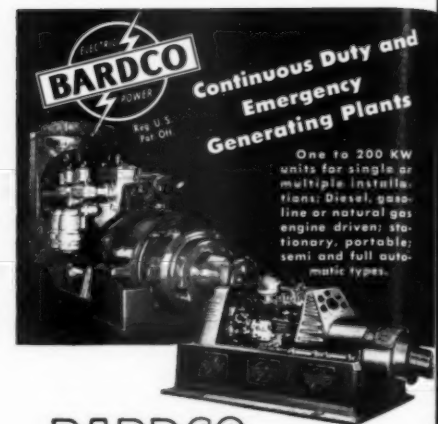
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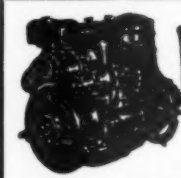
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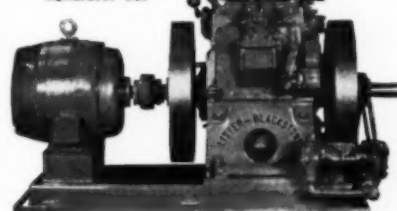
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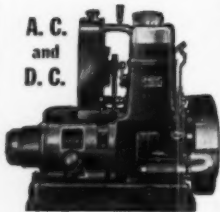
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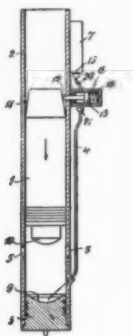
2,305,772

DIESEL POWER RAM

Konrad Haage, Esslingen on the Neckar, Germany; vested in the Alien Property Custodian
Application September 19, 1940, Serial No. 357,483

In Germany August 9, 1939
2 Claims. (Cl. 123-7)

1. A power ram comprising in combination, a substantially vertically arranged cylinder of a Diesel engine, a piston in said cylinder, one of said parts being stationary, the other freely reciprocable relative to the stationary part, means for depositing the quantity of fuel required for a ram stroke on the surface of the stationary part within said cylinder, which lies in the path of and is hit by said reciprocable part, when it drops, a gas exhaust port in one of said parts and means, arranged to be con-



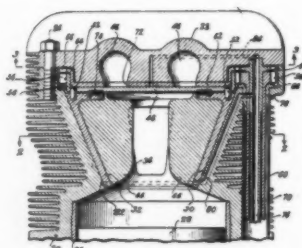
trolled by the other part during its downward or compression stroke, for actuating said fuel depositing means for fuel delivery onto said surface, whenever said other part approaches, but before it covers, said exhaust port.

2,308,839

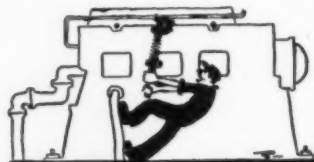
INTERNAL COMBUSTION ENGINE

William D. Tipton, Stoneleigh, Md.
Application September 21, 1942, Serial No. 459,164

21 Claims. (Cl. 123-190)



1. An internal combustion engine comprising a cylinder having a piston fitted therein to define a combustion chamber, an auxiliary combustion chamber periodically closed with respect to said combustion chamber, and rotary valve means between said chambers and controlling the passage of fluid to and from said cylinder and said auxiliary combustion chamber.



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